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DECEMBER 1986 VOLUME 5, NUMBER 8
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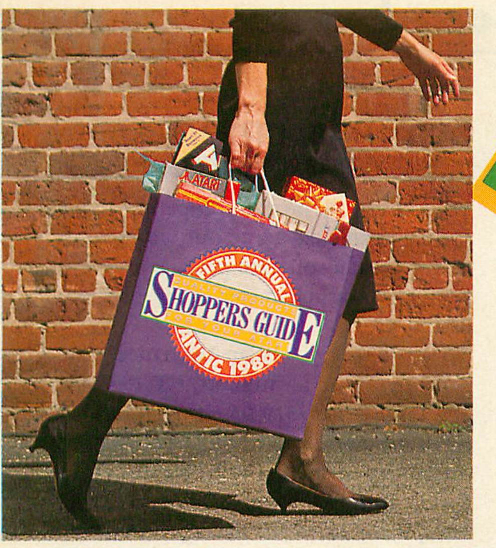
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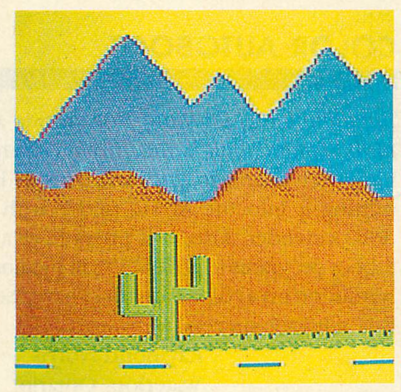


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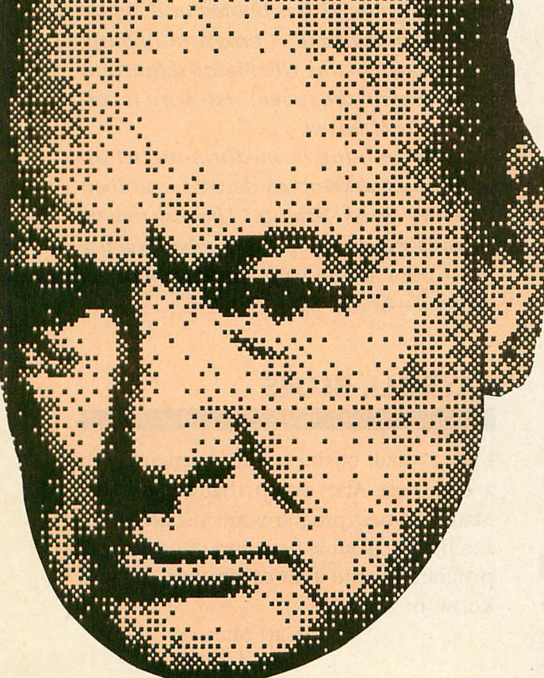




Fifth Annual Shoppers Guide 11



Landscape Illusion 67



Two New Atari Printers 50

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Editorial submissions should include text and program listings on disk and paper. Submissions will be returned if stamped, self-addressed mailer is supplied. **Antic** assumes no responsibility for unsolicited editorial material.



I/O Board

CASE OF THE MISSING RAM

Why do I get only about 20K of available memory with my Atari Microsoft BASIC II cartridge whether I have 32K or 48K of RAM installed in my 800?

David Ferguson
Pontotoc, MS

The reason for this is that the 16K cartridge "overrides" any RAM that would otherwise use the same address space. If the RAM is not there to begin with, it isn't missed. Standard Atari BASIC gives only 8K of address space, so a 48K machine will give you only 8K more available memory than a 32K machine. If you own an XL or XE and press the [OPTION] key while booting up, you are telling the computer to use its RAM instead of the "built-in" BASIC.—ANTIC ED.

WRONG POKES

In September's Tech Tips, the POKEs necessary for controlling the cassette motor were given in reverse order. POKE 54018,52 to turn it on and POKE 54018,60 to turn it off.

Richard Brewer
Princeton Junction,
New Jersey

WEFAX LED

When building the WEFAX Interface Board (**Antic**, September 1986) I recommend using a very low power consumption LED. Otherwise you may not "see the light." It is always good practice to use the lowest power consumption components available in any project.

Michael Angier
Seabrook, Texas

THANKS, CHARLIE

Many thanks to **Antic** Technical Editor Charlie Jackson for donating his survey compiler program, without which I probably would still be laboring over the figures from our club survey.

Paul Wheeler
MACE Membership Chairman
Detroit, MI

ODD CHARACTERS

When I list my progam on paper, Atari's special characters come out wrong. Can you suggest a software package that can print any Atari character in my program list?

Brian LaChance
Wolcott, CT

*Try Lister Plus ($19.95, Antic Catalog, AP0170). This program by Chet Walters, author of **Antic's*** Card Shuffler *(July, 1986) and* SSSnake! *(October, 1986) dumps any listed file to the printer usng any character set you choose.*— ANTIC ED

COLOR AUTOBOOT

How can I run 1st Word from inside an AUTO folder? This is the only program I have been unable to autorun on my ST by putting it into the AUTO folder with a .PRG extender. Also, is it possible to autoboot programs (e.g. dBMAN) in medium resolution on a color monitor? I have tried this without success.

Raymond Norris
Waterloo, Ontario,
Canada

The AUTO folder, if found, is executed right after the ST has booted and before GEM is initialized. A program making a single call to any GEM-related function will hang up the system. 1st Word is certainly GEM-based.

As for booting in medium-res, set up your color desktop as desired and then click on "Save Desktop." The disk will be active for a short time, and when you use it to boot with, your desktop will reappear.—ANTIC ED

PAYROLL BLUES

I am a small business entrepreneur with a complete Atari setup that I use daily. Many business programs are just great, but I'm having trouble finding a good payroll program for the 8-bit computers. Do you know of one?

Carl Manson
Seaside, CA

See the Miles Payroll System from Miles Computing in this issue's Shoppers Guide. A review of this product is scheduled to appear in a forthcoming issue.
—ANTIC ED

ANY 1020 PENS?

After I bought my Atari 1020 color plotter, I used it often. Now I can't use it at all because the pens have run out of ink. Where can I find another set of pens?

Russ Novotny
Orland Park, IL

At this writing, Atari Corp. is out of 1020 plotter pens, but plans to restock. Meantime, they suggest trying local dealers. If that doesn't work, maybe by the time you read this, the pens will be again be available from Atari Customer Service, 1196 Borregas Avenue, Sunnyvale, CA 94086. (408) 745-2000.—ANTIC ED

PRL LICENSES

This was Prospero Software's answer to my query about a distribution license for compiled Pro Fortran-77 programs using the company's PRL program:

"The position with run-time licenses is that it free—you may distribute the PRL with your software when you sell it."

This is the icing on the cake. There isn't a better deal around. Prospero has done the ST world a great service.

Jay Thaddeus
Houston, TX

FAIR SHAKE

Steve Roquemore's review of Micromod 2.4 (**Antic**, July 1986) was fair and greatly beneficial. I thank the Editorial Department for adding the updated information at the end of the review. This has saved much confusion on the part of those we've talked to.

Steve Bolduc
MicroMiser Software,
Orlando, FL

Antic welcomes your feedback, but we regret that the large volume of mail makes it impossible for the Editors to reply to everyone. Although we do respond to as much reader correspondence as time permits, our highest priority must be to publish I/O answers to questions that are meaningful to a substantial number of readers.

Send letters to: Antic I/O Board, 524 Second Street, San Francisco, CA 94107.

800 SPACEBAR

The spacebar on my Atari 800 has gone bad, and apparently only another keyboard will remedy it. The repair people can't find one, however, which means that all the hardware and software I've bought is useless.

I'm a teacher who uses a word processor during the school year, but I've been without the computer for several months because of this "parts" problem. Please tell me where I can find a keyboard or another 800, either new or to use for parts.

Laurie Pate
Monticello, GA

We can see that you have a strong attachment to your immobilized Atari 800, but consider that the current 65XE model can be bought for under $100—probably not much more than your keyboard repair would cost. Virtually all your existing software should run on the 65XE with no problems, and any isolated compatibility problems can be solved with the public domain program FIX XL ($10.95, Antic Catalog, PD0026.) If any readers have other ideas, please let us know.—ANTIC ED

MINER SETBACK

Atari game fans, Help! When playing Zone 10 of **Miner 2049er** by Big Five Software, I can't complete Quadrant 5. There are two areas in the lower corners that my miner can't reach. Is there a mathematical flaw in the screen layout making it impossible for the miner to jump or fall to these areas? I've killed more miners than any cave-in trying to find out. I would ask Big Five Software, but they don't seem to have a phone number anymore.

Curt Sayler
Bismarck, ND

MPP HANGUPS

Neither the MPP (Supra) 1000-C and 1000-E modems hang up the phone if they answered it. The modem only hangs up if it originated the call. MPP owners can get modification instructions from Supra Corp, 1133, Commercial Way, Albany, OR 97321.

Keith Ledbetter
CompuServe ID
76703,4061

UPWARD COMPATIBILITY

As my wife enters law school, I'd like to add an second inexpensive Atari to the household as a word processor. Will my older 800 software run on an 800XL as is? Will newer 8-bit software run on my older 8-bit? I sure don't want to build another software library from scratch.

Gerry Leone
Minneapolis, MN

Most Atari 8-bit software is "upwardly" compatible. That is, a program which runs on a 800 with 16K will also run on a 800XL with 64K or a 130XE with 128K. Incompatibility problems are rare today and can almost always be taken care of by the Atari Translator disk or FIX-XL, a public domain program (Antic Catalog, $10, PD0026.)—ANTIC ED

XM301 PRO*TERM

Is Mathew Arrington's modem program PRO*TERM (**Antic**, August 1985) compatible with the new Atari XM301 modem?

Gary D. Reed
Santa Ana, CA 92704

Yes, and it works without modification. Just plug it in.—ANTIC ED

Help!

SSSNAKE!!!

Sssnake!!! (October, 1986) tends to crash after about 10 minutes under certain conditions of play. If you're one of the people who has gotten the message "Error 13 at 571," you can fix the listing by substituting the following two lines.

```
MX 570 FS1=FS1-N*(FS1>N):IF FS1<>N THEN 5
   75
MY 571 POKE VVD,PUR:FOR I=N TO 200:POKE V
   F,I:POKE VF,I+TN:POKE BLF,I:NEXT I:GOT
   O 2000
```



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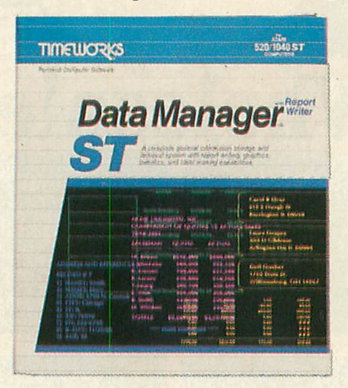
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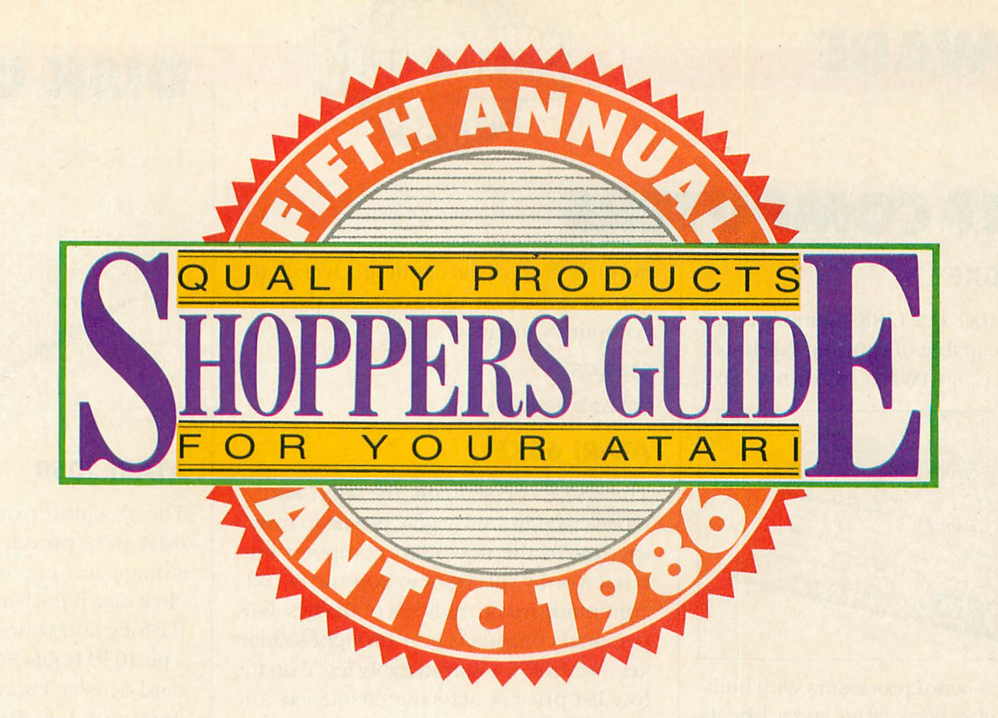
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THE FIFTH ANNUAL ANTIC SHOPPERS GUIDE is this magazine's selection of 100 best products—software, hardware and peripherals—available for *8-bit* Atari computers during the 1986 Holiday Season.

Because this has truly been a year of renaissance for the entire Atari community, we Atarians currently have many outstanding products on the market to choose from. In order to provide sufficient coverage of all these 1986 products, this year's Antic Shoppers Guide will report only on products for the *8-bit* Atari Computers. A full-scale ST Shoppers Guide is currently featured in the Winter issue of Antic's sister publication, STart: The ST Quarterly.

In certain major categories such as printers, modems and video monitors, so many makes and models are Atari-compatible that we cannot possibly test every product on the market. For these categories, Antic picks the best products with which we have had first-hand experience.

Mark Gottlieb

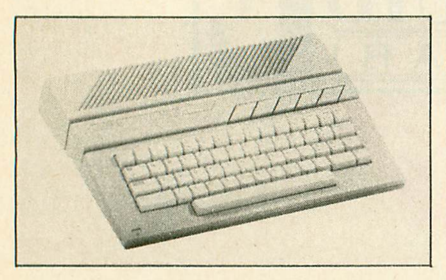
BY GREGG PEARLMAN, ANTIC JUNIOR EDITOR



8-BIT COMPUTERS

ATARI 130XE

The Atari 130XE is a 128K-memory computer that's capable of running "serious" productivity software without any



compromise—word processors with built-in spelling checkers, large spreadsheets and databases, etc. Yet it also has Atari's traditionally excellent graphics and ease of programming. The 130XE runs all the software written for any previous 8-bit Atari model, and the keyboard action is nothing short of outstanding. Overall, the 130XE is the best value in 128K personal computers today.

$149.95

CIRCLE **150** ON READER SERVICE CARD

ATARI 65XE

The 65XE is essentially the Atari 800XL repackaged in sturdy gray plastic to match the rest of the new Atari computer line. It is a worthy successor to 800 and 800XL, continuing in the tradition of the best 64K personal computers ever brought to market. Available for considerably less than the low list price at mass merchandisers, the 65XE is a fine choice for first-time computer buyers with its solid base of good software and self-teaching books.

$99.95

CIRCLE **150** ON READER SERVICE CARD

Atari Corporation 1196 Borregas Ave. Sunnyvale, CA 94086 (408) 745-2000

16-BIT COMPUTERS

ATARI 1040ST

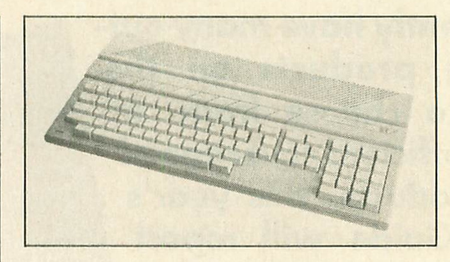
The 1040ST has a full megabyte of memory along with all the sterling features of the 520ST. It is also a bit more self-contained than its little brother, with a built-in double-sided disk drive that stores 720K and a built-in power supply to help cut down on the number of outside cables. The 1040ST is sold primarily at specialty computer stores, unlike the more mass-merchandised 520ST.

$999.95 with monochrome monitor
$1,199.95 with color monitor

CIRCLE **150** ON READER SERVICE CARD

ATARI 520ST

In only 18 months, the Atari 520ST has established itself as a major winner, with an impressive and fast-growing software base. This state-of-the-art personal computer boasts a fast, powerful Motorola 68000 microchip with 512K memory. (Independent upgrades to 1Mb are widely available for about $150.) The ST comes fully equipped with a 360K, 3 1/2-inch disk drive, a two-button mouse and the easy-handling GEM operating software with its icons and drop-down menu win-



dows. You also get a choice between a 512-color RGB monitor and a 640×400 high-resolution monochrome monitor.

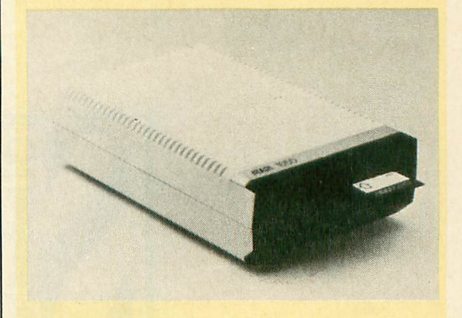
The ST's built-in connector ports include parallel and serial interfaces, MIDI for professional music-making and three types of video output. The keyboard includes a 10-key pad, one-touch cursor section and 10 programmable function keys.

$799.95 with monochrome monitor
$999.95 with color monitor

CIRCLE **150** ON READER SERVICE CARD

See the December-January issue of **START: The ST Quarterly** for an in-depth ST Shoppers Guide with a full listing of software and peripherals.

DISK DRIVES



ATARI 1050

The straightforward, reliable 1050 disk drive is the proven workhorse of Atari data storage. Just pop in your floppy disk and click down the latch. The busy light starts flashing and your software goes to work. The 1050 holds 86K of disk data in standard density. Using the enhanced density option of Atari DOS 2.5, the 1050's disk storage capacity goes up to 122K. Planned for debut at the November, 1986 COMDEX trade show is a new 3 1/2-inch disk drive for 8-bit Atari computers, with a new DOS and dramatically greater storage capacity.

$199.95. Atari Corp., 1196 Borregas Avenue, Sunnyvale, CA 94086. (408) 745-2000.

CIRCLE **150** ON READER SERVICE CARD

ASTRA ONE

Astra's The One ($299) is a double-sided, double-density drive with direct-drive motors. The **Astra 1001** ($250) disk drive is single-sided, double density, and the **2001** ($395) is a single-sided twin disk drive. The **Big D** ($495) is the double-sided version of the 2001. All prices are approximate.

Astra Systems, 2500 South Fairview, Unit L, Santa Ana, CA 92704. (704) 549-2141.

CIRCLE **151** ON READER SERVICE CARD

SUPRADRIVE HARD DISK

With 10 million bytes of data available virtually instantly at the touch of a key, the SupraDrive will dramatically change the way you use your computer. The first hard disk made for Atari 8-bit computers has proven itself a dependable performer and operates many Atari bulletin boards today. The SupraDrive stores the equivalent of more than 100 floppy disks. Our **Antic** Supradrive contains every 8-bit program ever published in the magazine—and we have seven megabytes left.

$799. Supra Corp., 1133 Commercial Way, Albany, OR 97321. (503) 967-9075

CIRCLE **163** ON READER SERVICE CARD



PRINTERS

ATARI XMM801

The **XMM801** dot-matrix printer prints bi-directionally, has graphics capabilities and is easy to operate. Our Atari Planetarium printouts on the XMM801 were every bit as good as those on the Star Micronics SG-10. The printer is easy to set up and has a well-indexed 73-page manual. (See review elsewhere in this issue.)

$219.95 Atari Corp., 1196 Borregas Avenue, Sunnyvale, CA 94086. (408) 745-2000.

CIRCLE **150** ON READER SERVICE CARD

STAR NL-10

The NL-10 is Star Micronics' latest in the ultra-popular line of full-featured printers that included the discontinued Gemini 10X and Star SG-10, as well as the current **NX-10** ($349) which is compatible with the Epson FX-80. An outstanding new near-letter-quality font and an expanded set of control buttons on the top panel are among the additions to the fast, sturdy, easy-operating NL-10 that provides every standard feature at a most affordable price. The NL-10 requires Star's $60 interface cartridges, which are also available for the IBM PC and Apple.

$319 plus $60 parallel interface. Star Micronics, Inc., 200 Park Avenue, New York, NY 10166. (212) 986-6770.

CIRCLE **155** ON READER SERVICE CARD

MONITORS

COMMODORE 1802

It's unexpected for **Antic** to publicize a monitor by Atari's arch-rival. But the Commodore 1702, predecessor of the new 1802, was the most widely-used color monitor reported in our recent ANTIC ONLINE survey. Commodore monitors are an outstanding price value and boast excellent color with separate chrominance and luminance input. Someday Jack Tramiel will probably get around to bringing out a fine Atari color monitor for 8-bit computers the way he did at Commodore. Until then, check out the 1802.

$249. Commodore Computer, 1200 Wilson Drive, West Chester, PA 19380. (215) 436-4200.

CIRCLE **157** ON READER SERVICE CARD



AMDEK 300A

This amber monochrome monitor is ideal for word processing and database or spreadsheet entry because it's so easy on the eyes. Amdeks were the most popular monchrome monitors with Atari owners responding to our ANTIC ONLINE survey.

$199. Amdek, 2201 Lively Blvd., Elk Grove Village, IL 60007. (312) 364-1180.

CIRCLE **158** ON READER SERVICE CARD

COLOR PRINTER



OKIMATE 10

Color printing is what you get from the small, quiet and inexpensive Okimate 10 thermal printer. The Oki prints 8"x5 1/4" color images on single-sheet or tractor-feed paper. Its color printouts can be bright and crisp, if you use coated ink-jet paper plus the RAMbrandt graphics software described in the Shoppers Guide software section.

$238 including Atari interface. Okidata Corp., 532 Fellowship Road, Mt. Laurel, NJ 08054. (609) 235-2600, (800) OKIDATA.

CIRCLE **156** ON READER SERVICE CARD

ENHANCEMENTS

ATARI XEP80

The long-awaited plug-in 80-column card is here at last. It boasts a razor-sharp text display, plugs into either joystick port and carries its own built-in Centronics parallel printer interface. It works with both monochrome and color monitors to produce bit-mapped graphics, international and graphics characters, inverse video or blinking text, underlining, double-high or double-wide text. Just keep in mind that it may be a little while before your favorite software is made compatible with this smart little 80-column box.

$79.95. Atari Corp., 1196 Borregas Avenue, Sunnyvale, CA 94086. (408) 745-2000.

CIRCLE **150** ON READER SERVICE CARD

ICD MULTI I/O BOARD

This important new I/O peripheral adds five functional devices to your 800XL (or 130XE with $19.95 adaptor) via the parallel bus. A 256K or 1Mb RAMdisk can partition its memory into multiple disks and be used as a print spooler. A parallel printer interface can be used with standard cables. An RS-232 port will work with serial modems or printers and includes a built-in 850 handler. A hard disk interface supports multiple drives in a variety of formats. An optional monochrome 80-column board ($99.95) is due for the holidays.

$199—256K, $349—1Mb. ICD Inc., 1220 Rock Street, Rockford, IL 61101. (815) 968-2228.

CIRCLE **159** ON READER SERVICE CARD



Captain's Log . . . War Date 10.01.44

America's Bestselling Naval Simulation!

"Captain's Log, October 1, 1944, 0250 Hours. Fleet submarine USS Hammerhead proceeding Southwest at cruising speed. Our mission: intercept enemy convoy off the coast of Borneo. Disperse and destroy.



"0300 Hours. Two hours until dawn. Radar picks up convoy, escorted by two destroyers. We believe that one of the enemy's valuable cargo ships is part of convoy formation."



"0400 Hours. Lookouts on the bridge. Target identification party reports one cargo ship, 4,000 tons, troopship of 10,250 tons, with two *Kaibokan*-type escorts. Moving into attack position."

Tandy 1000/IBM PC Jr. screens shown



"0500 Hours. Sound General Quarters! Battle stations manned. Preparing for torpedo run. Gauge Panel OK. Periscope OK. Charts and Attack Plot Board OK. All mechanical systems OK."



"0525 Hours. Torpedo rooms report full tubes forward and aft. Battery at full charge for silent running. We hope water temperature will provide thermal barrier to confuse enemy sonar."



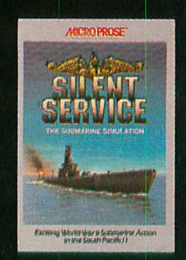
"0600 Hours. We are at final attack position. Convoy moving at 10 knots. Target distance decreasing rapidly . . . Crash Dive! Escorts have spotted us and are turning to attack! Rig to run silent."



"0700 Hours. Depth charged for one hour. Some minor damage, but repair parties at work. Destroyer propeller noises receding. We'll come to periscope depth for our return punch."



"0715 Hours. Torpedo tubes 1, 2, 3 fired. Two destroyers hit and sinking. One of the enemy's last cargo ships coming into 'scope view – an ideal target position. On my mark . . . Fire Tube 4! Fire 5!"



"Superb" raves Scott May in *On Line*, "strategic intensity and heart-pounding action have rarely been merged this successfully." *Analog* calls it flatly "the best submarine simulation so far." *Compute* comments "Silent Service's detail is astonishing." Join the more than 150,000 computer skippers who have volunteered for **Silent Service**, the naval action/tactics simulation — from MicroProse.

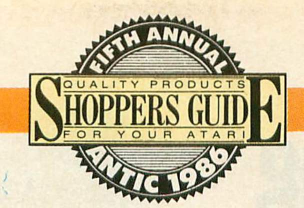
Silent Service is available for Commodore 64™/128™, Amiga™, Apple II family, Atari XL/XE, Atari ST, IBM PC/PC Jr, and Tandy 1000, at a suggested retail price of $34.95 (Atari ST and Amiga, $39.95).

Commodore, Amiga, Apple, Atari, IBM, and Tandy are registered trademarks of Commodore Electronics, Ltd., Commodore-Amiga Inc., Apple Computer, Inc., International Business Machines Corp., and Tandy Corp., respectively.

Available from your local retailer. If out-of-stock, contact MicroProse directly for further information on our full range of simulation software, and to place Mastercard/Visa orders.



CIRCLE 048 ON READER SERVICE CARD



RAMBO XL

Make your 800XL or 1200XL twice as powerful as a 130XE with the RAMBO XL, a 256K hardware modification for XL computers. It makes your computer compatible with the 130XEs RAMdisk in "CPU mode" for extended memory, meaning that the Atari DOS 2.5 RAMdisk and BASIC XE can run on your XL after installation of RAMBO XL.

$49.95, $30 installation, $28 for 256 RAM chip set. ICD Inc., 1220 Rock Street, Rockford, IL 61101. (815) 968-2228.

CIRCLE **159** ON READER SERVICE CARD

RAMCHARGER

Enhance your 8-bit computer's memory with RAMcharger RAMboards (256K, 512K or 1Mb memory). Installation is simple. Just plug in the board—and get 288K available with Synapse Software's SynCalc and SynFile+, up to 8,000 sectors of RAMdisk, and included MYDOS software.

$149.95—256K; $199.95—512K; $299.95—1Mb. Magna Systems, 147-05 Sandford Avenue, Suite 4E, New York, NY 11355. (718) 939-0084.

CIRCLE **160** ON READER SERVICE CARD

THE RAT

If you're clicking on icons and getting things done on your Atari without touching the keyboard, chances are you're using an ST. Now you can have that same convenience on your 8-bit computer with The Rat from Zobian Controls. Software such as Super 3-D Plotter, RAMbrandt and AtariArtist are Rat-compatible, and more is on the way.

$69.95. Zobian Controls, P.O. Box 6406, Wyomissing, PA 19610. (215) 374-5478.

CIRCLE **161** ON READER SERVICE CARD

MICROFLYTE JOYSTICK

Instead of renting a real airplane for an hour, why not pick up the MicroFlyte ATC Joystick and take control of Sublogic's Flight Simulator II with a minimum of keystrokes? This self-centering *analog* joystick uses two potentiometers to recognize the direction and magnitude of a turn—it helps you fine-tune your flying. However, it works only with Flight Simulator II or the programs you write yourself.

$59.95. MicroCube Corp., P.O. Box 488, Leesburg, VA 22075. (703) 777-7157.

CIRCLE **164** ON READER SERVICE CARD

EPYX 500XJ JOYSTICK

It's curved to fit your hand. The fire button is angled for your trigger finger. Shaft switches allow you to hear each move of the stick. And you might have to run it over in the car to break it. The 500XJ joystick has been a real joy to the **Antic** staff and saved us a lot of cramped hands. Our game scores seem to be better too.

$16.95-$19.95. Epyx Inc., 600 Galveston Drive, Redwood City, CA 94063. (415) 366-0606.

CIRCLE **165** ON READER SERVICE CARD

U. S. DOUBLER

The U.S. Doubler adds 128 bytes of RAM and a new ROM chip to your Atari 1050 disk drive, allowing true double density with 256-byte sectors. The drive can still be used in its normal single or enhanced density modes. When packaged together with SpartaDOS the price rises to $69.95. Version 1-4 allows your drive to be configured as drive 1 to drive 4. Version 5-8 allows you to configure the drive as 5 to 8, which is useful if you have a RAMdisk.

$39.95. ICD Inc., 1220 Rock Street, Rockford, IL 61101. (815) 968-2228.

CIRCLE **159** ON READER SERVICE CARD

INTERFACE

P:R: CONNECTION

The Atari 850-compatible P:R: Connection is a better mousetrap. Connections, software and applications remain the same. But the P:R: Connection gets its power from the host computer, eliminating need for an external power supply. The P:R: connects your Atari to a printer, a modem and one other device, such as a serial EPROM programmer. The outstanding documentation contains the complete R: driver source listing.

$69.95, 48K disk. ICD Inc., 1220 Rock Street, Suite 310, Rockford, IL 61101-1437. (815) 968-2228.

CIRCLE **159** ON READER SERVICE CARD

SPEECH/SOUND

VOICE MASTER

The Covox Voice Master is to sound what Computereyes is to pictures: it is a sound digitizer. This hardware-software system grabs sounds, converts them into digital code (in any of three speeds) and stores them for manipulation in various interesting ways. The Voice Master lets you compose digital music by humming or singing into the Covox headset/microphone. It also features surprisingly good speech recognition. Included BASIC demonstration programs are a talking alarm clock, a voice-recognizing calculator and a blackjack game that listens and talks back.

$89.95, 48K disk. Covox Inc., 675-D Conger Street, Eugene, OR 97402. (503) 342-1271.

CIRCLE **167** ON READER SERVICE CARD



SOUNDMOUSE

It works like a mouse, but it isn't. It's a sound-activated controller that plugs into the joystick port and listens for sounds, particularly low-pitched tones. It continuously translates the sound volume into a value for the paddle register. The SoundMouse responds to the sounds—perhaps your program can be activated with a shout or hand clap. You could use the SoundMouse as a joystick trigger with some games, steering with the stick and shooting by yelling "Fire!"

$29.95, 48K disk. Soundsoft Inc., P.O. Box 740, 10 Maple Avenue, Andover, NJ 07821. (201) 786-6060.

CIRCLE **168** ON READER SERVICE CARD

MODEMS

ATARI SX212

Brand-new from Atari is this speedy 1200 baud, Hayes-compatible modem that plugs directly into Atari computers or daisy- ▶

Now, nothing can keep you from your appointed rounds.





Laugh at the weather. Putt in the middle of the night. Tell your secretary to hold all calls. With Accolade's MEAN 18, all the excitement and challenge of real golf is right on your computer.



MEAN 18 delivers the kind of realism and playability you've come to expect from Accolade. This is golf the way it was meant to be enjoyed... without spending your day decoding the instruction manual. You can hit a bucket of balls at the driving range, play from the pro or regulation tees, even ask your caddy to suggest your clubs.

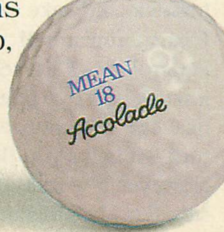


Once you've mastered MEAN 18, there's the challenge of playing on three of the world's legendary golf courses, all capable of bringing any touring pro to his knees. With The Course Architect, you can even design your own grueling course complete with menacing bunkers and greens on the edge of an ocean.

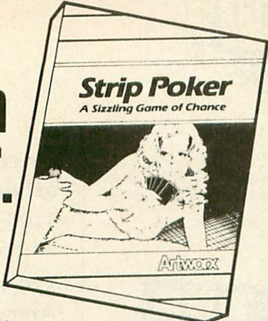
Available for IBM, Atari ST and Amiga systems.

Accolade, 20833 Stevens Creek Boulevard, Cupertino, California 95014. Telephone 408-446-5757.





Atari ST heats up with "Strip Poker"... and more.



Examine Artworx' expanding list of ST software:

STRIP POKER is *the* classic computer program. Play against Suzi and Melissa; the more you win, the more they take off! **Only $39.95**

THAI BOXING brings oriental kick boxing to the ST with stunning 3-D graphics and fast action. **Only $19.95**

HOLE IN ONE GOLF plays like the real thing and includes an easy-to-use Editor for designing your own golf course. **Only $29.95**

BRIDGE 4.0 has full graphic display of all hands, allows the user to be dealt good cards all the time and is completely mouse-driven. **Only $29.95**

COMPUBRIDGE is Artworx' bridge tutorial, utilizing 10 chapters covering all aspects of the game. **Only $29.95**

PEGGAMMON is a new and innovative approach to backgammon. Play against the computer or with a friend in the two-player mode. **Only $17.95**

MAILLIST handles medium to large sized lists. It zip code sorts, alphabetizes, selects by keyword, prints labels, and more. **Only $17.95**

BAKER STREET DETECTIVE brings you back to 1893 London with mysteries to solve just like Sherlock Holmes. **Only $17.95**



Artworx Software Co., Inc., 1844 Penfield Road, Penfield, N.Y. 14526 (716) 385-6120 · (800) 828-6573

CIRCLE 003 ON READER SERVICE CARD

Now you can RAMCHARGE Your Atari® 800

with the new Magna 1MEG RAM-Board

- Enhanced memory capabilities
- Simple one-minute plug-in installation
- 100% Axlon® compatibility
- 288K available with Synfile+™/Syncalc™
- Up to 1 million bytes on a single board
- Up to 8000 sectors available as a Ramdisk
- MYDOS™ Ramdisk software included
- XL/XE/ST upgrades available also — call

RAMCHARGER 256K — $149.95
RAMCHARGER 512K — $199.95
RAMCHARGER 1MEG — $299.95

Ramchargers use custom printed circuit boards. We do not rewire your "old" Atari 16K boards as others do.

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"We build power"

Terms: Check, Money Order, COD
Add $4.50 shipping & handling.
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147-05 Sandford Ave., Suite 4E
Flushing, N.Y. 11355
Phone: 718-939-0908
Bulletin Board 24 hrs. — 212-828-7658

CARINA - THE BETTER BBS

Presenting the most powerful bulletin board ever written for the Atari 8-bit computer. The Carina BBS is absolutely the most expandable bulletin board for your Atari. It has features that you will find on most bulletin boards plus many other features that make telecommunications easier, more fun, and a lot less monotonous.

WHY IS THIS BBS SO MUCH BETTER?

The power of this system is mostly attributed to the Modem Operating Environment. It makes possible the ability to run BASIC programs WITH LITTLE OR NO MODIFICATION on your bulletin board. It also allows you as the Systems Operator (SysOp) of the Carina BBS to drop into BASIC ON-LINE at any time and make modifications to your program from across the country if need be. No other Atari bulletin board has this feature.

YOU MEAN I CAN CHANGE THE PROGRAMS?

Yes, the Modem Operating Environment eliminates the need to perform modem operations. The bulletin board is written in understandable BASIC and is, in fact, designed with modification in mind. The Carina BBS is also module based. This means you are no longer restricted by the memory of your computer, but rather by the amount of on-line storage on your disk drives and your ramdisk. The Carina BBS itself is not 1 but 7 separate programs. It is a massive system that can be expanded beyond your imagination.

WHAT PROGRAMS COME WITH IT?

The modules included are: The waitcall module which performs user logon/logoff functions, the bulletin board itself which controls all message bases and databases, the file-transfer module with X-Modem upload/download transfer protocol, the message editor (with extensive word processor-like functions), the SysOp commands with the most powerful functions available for any bulletin board on-line, the sub-commands module which contains miscellaneous extra functions, and an on-line trivia game. The Carina BBS has a total of 44 commands including 17 SysOp functions. It is easy to add any other modules of your own, plus there is plenty of room to add any other functions in different modules.

WHAT ELSE CAN IT DO?

- Runs at 300, 1200, or 2400 baud in ASCII and/or ATASCII modes
- Works with Hayes (or compatable) modems, all Supra (MPP) modems including Supra 1200 with interface, Avatex 1200, Q-MODEM, and now the XM301 and 1030 (with ring detector)
- Works with the 850 interface, ATR8000, or P:R:Connection
- Supports the R-Time 8 cartridge
- Also works on hard drives or slave drives of any size, in any density
- Works with most DOS's and most BASIC languages (Atari, XL, or XE)
- Run BASIC programs with little or no modification, program in BASIC, or even go to a ram-resident DOS (Like SpartaDOS) on-line!
- Electronic mail system
- Uses macros or full-word commands
- Allows editing of messages already posted
- Virtually an unlimited number of message bases, and databases
- Can work with subdirectories
- Read new mail function
- On-Line games (you can convert your own games to work easily too)
- A day calculating clock plus a 5 line status window at the top of the screen holding 16 items of user information
- Message editor with many editing commands and word-wrap
- Self-Compacting message bases eliminating the need for constant maintenance.
- Automatic validation and access control configuration.

For an indepth on-line demonstration, call 305-793-2975

Price Reduction:
Now, get the Carina BBS at the reduced price of only $55.00 (this includes shipping and tax where applicable).

Supra (MPP) 300 baud modem owners include an extra $10.00 for the Bitwise System's MPP-Hayes emulator. And now, XM301/1030 (with ring detector) owners, also add $10.00 for the Bitwise System's XM301-Hayes emulator. Please specify Modem type when ordering.

Carina Software Systems
12390 57th Road North
Royal Palm Beach, FL 33411

CIRCLE 086 ON READER SERVICE CARD



chains with your peripherals. Comes complete with built-in speaker, signal lights and software.

$99.95. Atari Corp., 1196 Borregas Avenue, Sunnyvale, CA 94086. (408) 745-2000.

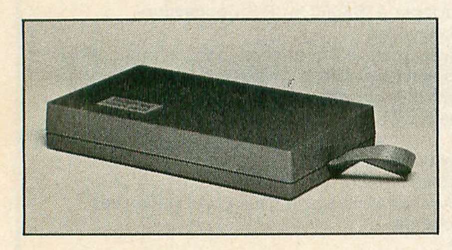
CIRCLE **150** ON READER SERVICE CARD

ATARI XM301

This worthy successor to the Atari 1030 builds several advanced features directly into an inexpensive 300 baud modem that plugs directly into your Atari computer. It has auto-dial and auto-answer and doesn't need a separate power supply. Included in the package are a fine 49-page manual and the powerful XE-Term software.

$49.95, 32K disk. Atari Corp., 1196 Borregas Avenue, Sunnyvale, CA 94086. (408) 745-2000.

CIRCLE **150** ON READER SERVICE CARD



SUPRA 300-AT

Formerly the MPP 1000-E, the 300 baud Supra 300-AT comes with Smart Term software that allows uploading, downloading, auto-dialing, auto-answer and XMODEM protocol. It plugs directly into your Atari computer.

$49.95. Supra Corp., 1133 Commercial Way, Albany, OR 97321. (503) 967-9075.

CIRCLE **163** ON READER SERVICE CARD

AVATEX 1200-BAUD MODEM



The new Avatex modem gives you inexpensive Hayes compatibility and reliable operation. It operates with a subset of the Hayes commands that gives you virtually all the important functions. The Avatex usually can be found between $79 and $129 at dealers. It requires an 850 or P:R: interface and can also be used with an ST.

$199. E+E Datacom, 1230 Oakmead Parkway #310, Sunnyvale, CA 94086. (408) 732-1181.

CIRCLE **169** ON READER SERVICE CARD

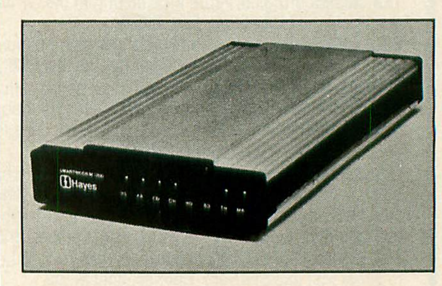


VOLKSMODEM 10

This inexpensive 300 baud modem plugs directly into the Atari's joystick port 2. Not to be confused with the Hayes-compatible 1200-baud Volksmodem 12 that requires an 850-compatible interface.

$79.95. Anchor Automation, 6913 Valjean Avenue, Van Nuys, CA 91406. (818) 997-7758.

CIRCLE **170** ON READER SERVICE CARD



HAYES SMARTMODEM 1200

The Smartmodem 1200 is the industry standard that all other modems are judged by. The Hayes offers solid construction, automatically adjusted baud rate, internal speaker, auto-answering and outstanding documentation. Most commercial modem software is written to be compatible with the standard set of Hayes commands. It requires an 850 or P:R: interface and can also be used with an ST.

$599. Hayes Microcomputer Products, 5835 Peachtree Corners East, Norcross, GA 30092. (404) 449-8791.

CIRCLE **171** ON READER SERVICE CARD

ONLINE SERVICES

COMPUSERVE

CompuServe is the leading online information service, and with good reason. You can get stock quotes, news, and weather reports; make airline reservations, buy merchandise, play games; enter special interest groups (SIGs) on dozens of topics. CompuServe is where you'll find the ANTIC ONLINE edition and three bustling Atari SIGs (8-bit, 16-bit and Atari Developers) with hundreds of 8-bit and ST programs to download. And upload time is free. Hourly rates are $6 evenings-weekends and $12.50 prime time for 300 baud, $12.50/$15 for 1200 baud, $15/$19 for 2400 baud. $39.95 entry fee.

Hourly rates and membership fees for commercial online services are subject to change. Contact individual companies for latest information. You'll need a modem to hook up.

500 Arlington Center, Box 20212, Columbus, OH 43220. (800) 848-8199; in Ohio, (614) 457-8600.

CIRCLE **174** ON READER SERVICE CARD

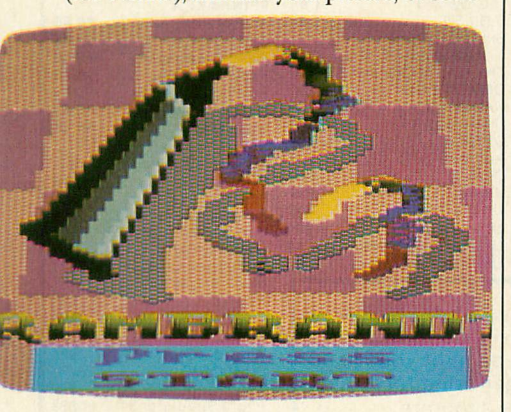
GAMES COMPUTERS PLAY

Let your Atari play games with a 300Mb minicomputer that offers spectacular interactive games in color, real-time conferencing, electronic mail and public domain downloading. Evening and weekend rate is $6 per hour, and prime time rate is $15 per hour. A $29.95 sign-up fee includes disks, documentation and $18 free

SOFTWARE GRAPHICS

RAMBRANDT

RAMbrandt paint software produces color images with KoalaPad or Atari Touch Tablet in five graphics modes and multiple text fonts. You can load pictures from Moviemaker, Micro Illustrator, Micro-Painter and Computereyes. The window mode lets you vertically or horizontally rotate, flip (for T-shirts), animate your picture, or scale



it up or down in size. RAMbrandt has unlimited user-defined brushes, 130XE RAMdisk support and printer dumps for Epson, Star Micronics, C. Itoh, NEC and compatibles. Its Okimate 10 color printer dump produces fine color images. New **Solid Object Module** ($15.95, AP082) adds easy 3-D object creation to RAMbrandt.

$19.95, 48K disk. The Catalog, AP0157.

COMPUTEREYES

Connect your Atari to any video camera or VCR and you'll get a digitized black-



and-white image in less than six seconds. The image can then be modified with standard graphics software. The Computereyes package includes an interface module, software and an owner's manual. For $399.95, you also get a black-and-white video camera.

$129.95, 48K disk. Digital Vision, Inc., 14 Oak Street, Suite 2, Needham, MA 02192. (617) 444-0940.

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SUPER 3-D PLOTTER

With this 3-D design and animation program, all you need to do is draw straight-line images from point to point. The program remembers the points of your line drawing, adjusts, redraws and page-flips the completed new image, resulting in a smooth, impressive animation display.

$39.95, 48K Disk. Elfin Magic Company, 23 Brook Place, East Islip, NY 11730. (516) 581-7657.

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ENVISION

Envision is "the RAMbrandt of character graphics," giving you multi-screen, eight-way scrolling pictures and letting you build animations of up to 128 frames at 10 speeds. Envision's 50-plus commands give you total control over the Atari's text modes. And the program supports GTIA modes 9 and 11. It can create standalone pictures from pictures created by any popular paint program, or produce BASIC and Assembler source code.

$19.95, 48K disk. The Catalog, AP0185.

VIRTUOSO

Create full-color graphics with the keyboard, joystick or touch tablet, move them in any direction at different speeds, instantly make them larger or smaller—while they're moving—and turn them 360 degrees with Virtuoso Software. If that's not enough, put music in motion. The graphics you create and the movements you choose, simultaneously produce and control music. Text can be inserted too.

$49.95. Virtusonics Corp., 125 Duke Ellington Blvd., New York, NY 10025. (800) 528-6060.

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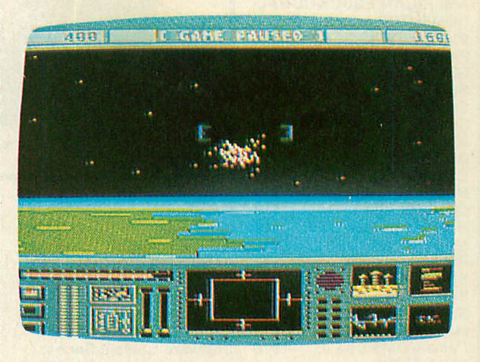
ARTIST UNLEASHED

Using a joystick, KoalaPad or the Rat to control the onscreen painting dot, you can create high-resolution Graphics 8 pictures for saving to disk, inserting in BASIC programs or printing on an Epson-compatible. Enhance or alter the pictures by stretching, inverting, displaying in inverse video, changing colors and rotating in 90-degree increments. The picture editor breaks down a picture into grids for detail work. Used with MTS's **Layout** ($39.95), you can compose newsletters, posters and advertising materials.

$49.95, 48K disk. MTS Software, P.O. Box 623, Williamsville, NY 14221. (716) 634-0578.

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GAMES



STAR RAIDERS II

More of a sequel than an update to the original Star Raiders, this game has you jumping between two star systems in your ship, the Liberty Star, and wiping out hordes of Zylons in an attempt to save the Celos IV system. Just fire away at the bad guys, but don't run out of fuel.

$19.95, 48K disk. Atari Corp., 1196 Borregas Avenue, Sunnyvale, CA 94086. (408) 745-2000.

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GENIE

GEnie, the General Electric Information Service, is the newest and least expensive online service, costing $5 an hour on evenings-weekends, even for 1200-baud modems ($10 for 2400-baud). Weekday rates are more business-oriented, $25 per hour for 300/1200 baud and $45 for 2400 baud. Upload time is free. The SIG-like Atari RoundTable software library has 11 categories and is growing fast.

401 N. Washington Street, Rockville, MD 20850. (800) 638-9636.

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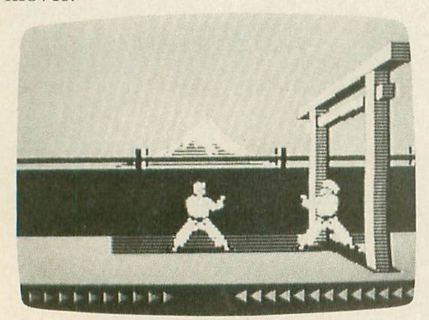
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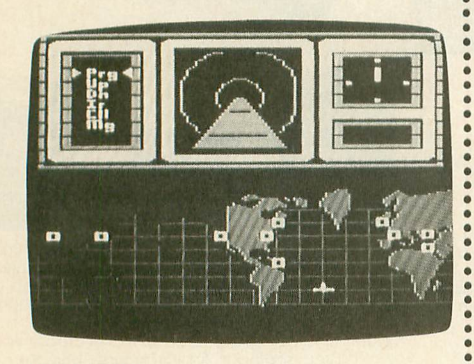


warlord's castle by thwarting his guards with your karate know-how, using the joystick to kick and punch. Karateka has cartoon-quality graphics, realistic even to the swishing robes as you make your moves.



$29.95, 48K disk. Broderbund Software, 17 Paul Drive, San Rafael, CA 94903. (415) 479-1170.

CIRCLE **183** ON READER SERVICE CARD



HACKER

Not unlike the film "War Games," you've broken into the computer of a large multinational corporation, where you discover dirty deeds. Make deals with foreign spies and pick up clues, all very hush-hush and all from the comfort of your chair.

$34.95, 48K disk. Activision, P.O. Box 7286, Mountain View, CA 94039. (415) 960-0410.

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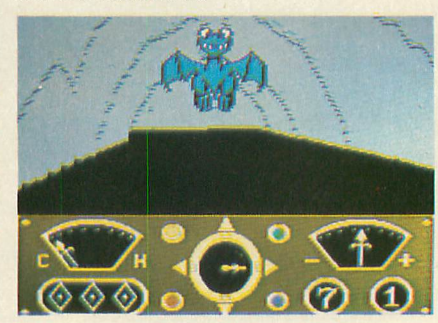


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The latest entry in Lord British's popular graphic fantasy role-playing adventure series lets you carry on complete conversations with other characters as you try to attain perfection in the values of honesty, compassion, valor, spirituality, humility, sacrifice, justice and honor, after which you go to the final challenge: to become an Avatar.

$59.95, 48K disk. Electronic Arts, 2755 Campus Drive, San Mateo, CA 94403. (415) 571-7171.

CIRCLE **185** ON READER SERVICE CARD



THE EIDOLON

One of the latest Lucasfilm computer games, The Eidolon sends you through a maze of caverns generated by fractal mathematics. Your goal in Epyx's point-of-view fantasy role-playing game is to find and vanquish a dragon on each of 10 levels.

$29.95-$39.95, 48K disk. Epyx Inc., 600 Galveston Drive, Redwood City, CA 94063. (415) 366-0606.

CIRCLE **184** ON READER SERVICE CARD



KORONIS RIFT

It's 2049, and you're exploring the Koronis Rift for super weapons left by the Ancients. If you can get by the saucer people and figure out how to use the weapons, you're in great shape. If not, you're Saucer People Chow. In this Lucasfilm game, you'll get plenty of help from your science and retriever droids as you travel the fractal landscape of the planet in your surface rover.

$29.95-$39.95, 48K disk. Epyx Inc., 600 Galveston Drive, Redwood City, CA 94063. (415) 366-0606.

CIRCLE **184** ON READER SERVICE CARD

WISHBRINGER, SPELLBREAKER, BALLYHOO

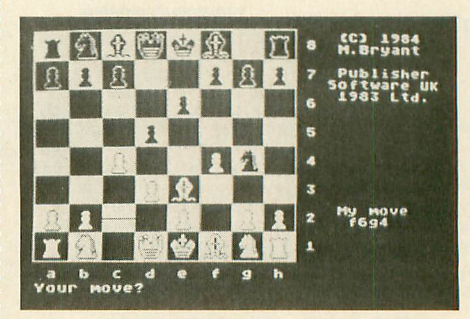
Wishbringer ($34.95), Infocom's second introductory-level text adventure, opens on the New England coast, where you're dispatched to deliver a letter to an eccentric old lady. Upon delivery, you are thrust into Witchville to rescue her cat, kidnapped by a sorceress called The Evil One. Your only aid is Wishbringer, a stone that grants seven wishes—don't misuse it.

Spellbreaker ($49.95) concludes Infocom's Enchanter and Sorcerer trilogy. You're now a member of the Circle of Enchanters and your only clue to the ominous disappearance of magic is the discovery of a strange white cube. As you go on, further cubes provide invaluable hints.

In Ballyhoo ($39.95) you're loitering under the big top after a performance of the Traveling Circus That Time forgot. You overhear a plot to kidnap the ringmaster's daughter. You've got to find her, but you must be stealthy and willing to slip into any disguise.

Infocom, 125 CambridgePark Drive, Cambridge, MA 02140. (617) 492-6000.

CIRCLE **186** ON READER SERVICE CARD

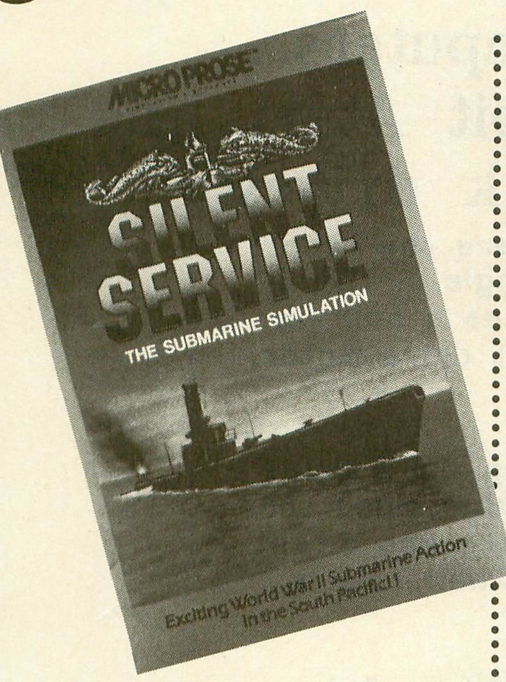


COLOSSUS CHESS

Colossus Chess is for any chess-lover, whether you're a beginner or a master. The space bar toggles between two screens—one showing the board and the other showing Colossus' "brain" considering thousands of moves. Onscreen elapsed-playing-time clocks add realism, and a game can be saved to disk to be picked up later.

$15.95, 48K disk. The Catalog, AP0161.



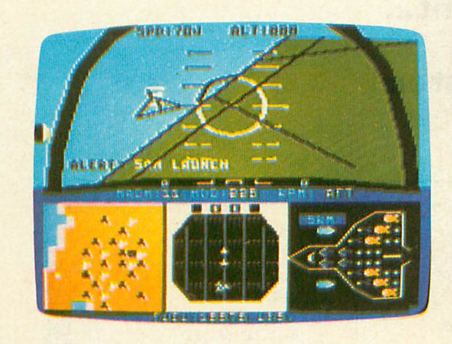


SILENT SERVICE

This impressive simulation of World War II submarine operations in the Pacific takes you right to the bridge of a sub as your periscope searches the ocean for enemy vessels.

$34.95, 48K disk. MicroProse Software, 120 Lakefront Road, Hunt Valley, MD 21030. (301) 667-1151.

CIRCLE **188** ON READER SERVICE CARD

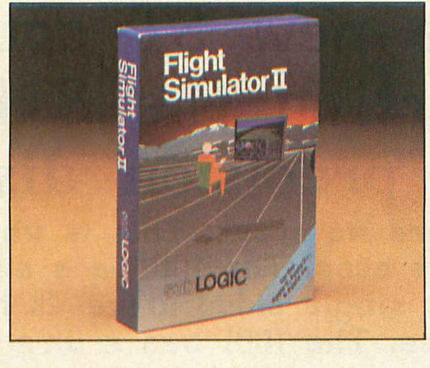


F-15 STRIKE EAGLE

Launch into aerial combat with this realistic, joystick-controlled computerization of seven sky battle-zones over the Middle East and Vietnam. You'll get state-of-the-art weapons systems, computerized radar, eight supersonic guided missiles, 18 bombs and a 20mm cannon.

$34.95, 48K disk. MicroProse Software, 120 Lakefront Road, Hunt Valley, MD 21030. (301) 667-1151.

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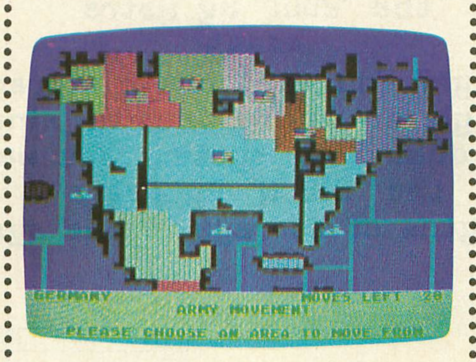


FLIGHT SIMULATOR II

Zoom your Piper Cherokee Archer around Chicago, New York, Seattle, Los Angeles or any of 80 realistic airports in this advanced flight simulation program. This sophisticated pilot training software provides believable flying practice after you learn the precise and detailed operating instructions. New this year are additional **Scenery Disks** including San Francisco and Tokyo-Osaka ($19.95 each) and a six-disk Western U.S. set for $99.95.

$49.95, 48K disk. Sublogic Corporation, 713 Edgebrook Drive, Champaign, IL 61820. (217) 359-8482.

CIRCLE **187** ON READER SERVICE CARD



NAM, COLONIAL CONQUEST, BATTALION COMMANDER

Along the same lines as Conflict in Vietnam, SSI's Nam pits one player against a computer as tough as the Viet Cong and North Vietnam army units it simulates in six basic scenarios.

Battalion Commander, another solitaire game, lets players explore the strategy and tactics of the fictional battlefields of the 1990s and essentially design their own battle. Select a battlefield from 40 different terrain maps.

Colonial Conquest immerses as many as six players in the turbulence of the birth of the modern world. Besides being entertaining, the historic scenarios provide some interesting insights into the dynamics of imperialism as it grew from the strengths and weaknesses of the major nations.

$39.95 each, 48K disk. Strategic Simulations Inc., 1046 N. Rengstorff Avenue, Mountain View, CA 94043. (415) 964-1353.

CIRCLE **189** ON READER SERVICE CARD



RACING DESTRUCTION SET

Build your own racetracks and race nine different kinds of vehicles—even choose the gravity conditions. You'll have an endless variety of races in this digital slot-car set. Racing Destruction Set also has 50 built-in tracks, and you can save 58 tracks per disk.

$14.95, 48K Disk. Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. (415) 571-7171.

CIRCLE **185** ON READER SERVICE CARD

CROSSWORD MAGIC

Designing your own crosswords can be just as challenging as solving them, and with crossword puzzles being so popular, Crossword Magic could be an income-producing tool as well as a fun challenge. Crossword Magic takes the drudgery out of trial-and-error testing of up and down word patterns—it's a word processor dedicated to the connection of words sharing one or more letters. You start with a 3-by-3 grid, which adjusts and increases in size to fit your words.

$39.95, 48K disk. Mindscape Inc., 3444 Dundee Road, Northbrook, IL 60062. (800) 221-9884.

CIRCLE **190** ON READER SERVICE CARD

MICROLEAGUE BASEBALL

Pit the greatest teams against each other, such as the 1927 Yankees and 1975



Astra is excited about the "NEW" Atari... That's right, we are excited, but not just about the new ST computers... We are supporting the 8 bit Atari line with four precision disk drives!

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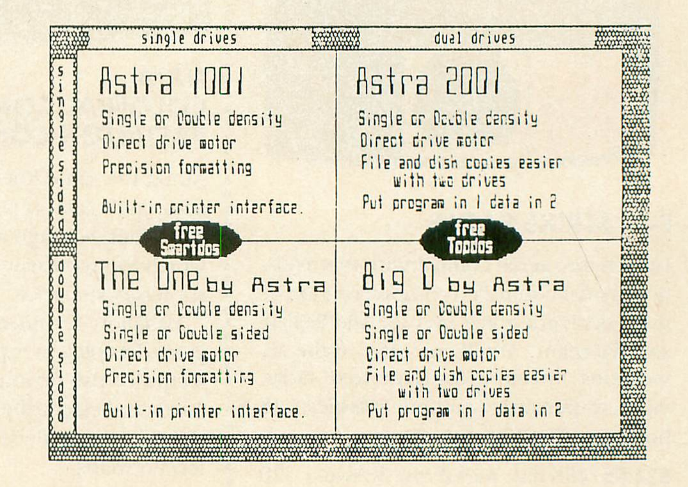
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ASTRA SYSTEMS, INC.

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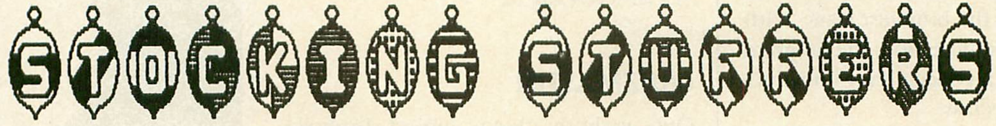
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20 megabyte hard drive
1 megabyte 3.5" microfloppy

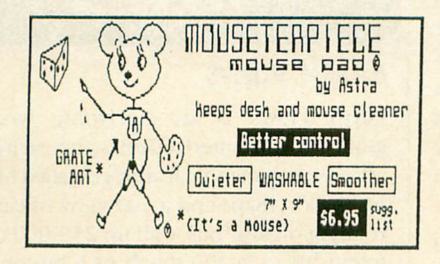
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Reds—or even play them against the pitiful Washington Senators of 1955—in this baseball lover's delight. MicroLeague Baseball lets you hit-and-run, attempt squeeze plays and double steals, pitch out and make several other moves.

$39.95, 48K disk. MicroLeague Sports Association, 2201 Drummond Plaza, Newark, DE 19711. (302) 368-9990, (800) PLAYBAL.

CIRCLE 193 ON READER SERVICE CARD

HARDBALL

This arcade-style baseball game features enticing graphics and 3-D perspective from three views. The joystick is used to choose lineups, select pitches and move fielders.

$29.95, $48K disk. Accolade, 20833 Stevens Creek Blvd., Cupertino, CA 95014. (408) 446-5757.

CIRCLE 194 ON READER SERVICE CARD

COMMUNICATIONS

HOMEPAK

This package incorporates HomeTerm, a simple but powerful telecommunications program that accesses online services and bulletin boards; HomeFind, which stores information and instantly retrieves it; and HomeText, an easy word processor. All three programs can pass information to each other.

$49.95, 48K disk. Batteries Included, 30 Mural Street, Richmond Hill, Ontario, L4B 1B5, Canada. (416) 881-9941.

CIRCLE 198 ON READER SERVICE CARD

BACKTALK

With Backtalk, your Atari can autodial other BBS's in the middle of the night and upload or download files in XMODEM (with or without Cyclical Redundancy Checking), AMODEM (Atari-style Xmodem) or Xon/Xoff). 130XE owners can save money on CompuServe with Backtalk's RAMdisk support. You have total modem compatibility and you can create unlimited macro libraries.

$19.95, 48K disk. The Catalog, AP0154.

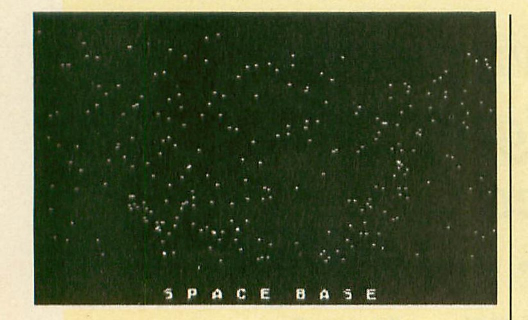
PLATO LEARNING PHONE

This cartridge makes your Atari work like a Plato terminal. Plato is the largest educational online service in the world, devoting over 200,000 hours to languages, mathematics, sciences and more.

$24.95, 16K cartridge. Atari Corp., 1196 Borregas Avenue, Sunnyvale, CA 94086. (408) 745-2000.

CIRCLE 182 ON READER SERVICE CARD

EDUCATION



SPACE BASE

A must if you own a telescope. This graphically stunning scrolling map and space atlas offers detailed scientific data for hundreds of the brightest stars. With its extensive documentation, the program is equivalent to a college-level introductory astronomy class.

$19.95, 48K disk. The Catalog, AP0142.

ATARI PLANETARIUM

Look at the stars tonight—or any night between 9999 B.C. and A.D. 9999—from anywhere on Earth with Planetarium. At up to 64 times normal speed, forwards or backwards, view any celestial event, from the appearance of Halley's comet over Australia on April 5, 1986 to the earliest recorded solar eclipse.

$24.95, XL/XE and disk. Atari Corp., 1196 Borregas Avenue, Sunnyvale, CA 94086. (408) 745-2000.

CIRCLE 182 ON READER SERVICE CARD

RAINY DAY GAMES

Younger children will love the company of Ted Bear on Baudville's Rainy Day Games. Ted always plays fair and he shows little ones how to have fun playing such favorites as Concentration, Old Maid and Go Fish.

$29.95, 48K disk. Baudville, 1001 Medical Park Drive, S.E., Grand Rapids, MI 45906. (616) 957-3036.

CIRCLE 195 ON READER SERVICE CARD

QUIZMASTER

Quiz anybody on any subject, from riddles to nuclear physics, with the Quizmaster Construction Set. Create your own multiple-choice quizzes with an unlimited number of questions. As the screen displays a question, a counter rapidly counts down from 500, and you get the number of points equal to the counter display when you press the key for the right answer.

$9.95, 48K disk. Ezuse Software, 2850 Enea Way, Antioch, CA 94509. (415) 754-6026.

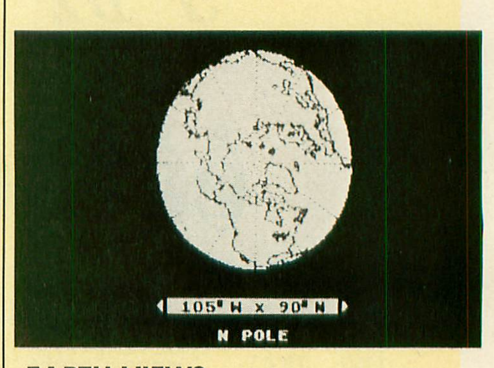
CIRCLE 196 ON READER SERVICE CARD

GRADESCAN

This user-friendly, menu-driven program helps a teacher track students, classes and grades. Among its options are Examine Averages, Examine Class Averages, Correct or Revise Records, and Print Reports.

$24.95, 48K disk, requires BASIC. C. Robert Blum, 1722 Golden Court, Crofton, MD 21114. (301) 261-3177.

CIRCLE 197 ON READER SERVICE CARD



EARTH VIEWS

Earth Views is an electronic world globe—a computerized atlas and exciting adventure game that features detailed high resolution maps and a 3-D view of earth rotating on any axis. Call up 250,000 different views at the touch of a button.

$19.95, 48K disk. The Catalog, AP0141.



BBS EXPRESS!

The newest member of the Express! family, which includes 1030, 850 and MPP Express! programs. The 1030 version of BBS Express! also runs on the new Atari XM301 modem, supporting both XMODEM and ASCII downloading. Sysops can customize bulletin board through powerful features. BBS Express! can run using all currently available memory upgrades, and full remote sysop capabilities can be accessed from anywhere in the world.

$39.95, 48K disk. Orion Micro Systems, 2919 Ennismore Court, Richmond, VA 23224. Specify 850 or 835/1030/XM301 version.

CIRCLE **199** ON READER SERVICE CARD

LANGUAGES & TOOLS

BASIC XE

BASIC XE from O.S.S. runs programs at least twice as fast as Atari BASIC. BASIC XE has powerful new statements, automated editing features and extra utilities. This language harnesses the full 128K memory of the 130XE computer.

$79, cartridge plus 48K disk. Optimized Systems Software, 1221B Kentwood Avenue, San Jose, CA, 95129. (408) 446-3099.

CIRCLE **200** ON READER SERVICE CARD



BASIC VIEW

Lighten your debugging load with Basic View, a machine language programming utility that traces BASIC programs as they run. As each line of your code is executed, the BASIC tracer highlights it in a screen window, enabling you to find bugs right away.

$20, 48K disk. Softview Concepts, P.O. Box 1325, Lisle, IL 60532. (312) 968-0605.

CIRCLE **204** ON READER SERVICE CARD

ACTION!

Fast and powerful, ACTION! blends elements of Pascal and C, but is much easier to program on the Atari. The ACTION! screen editor makes programming a joy and was the basis of Batteries Included's PaperClip word processor. Particularly outstanding for speedy graphics and game programs.

$79, 16K cartridge. Optimized Systems Software, 1221B Kentwood Avenue, San Jose, CA 95129. (408) 446-3099.

CIRCLE **200** ON READER SERVICE CARD

MAC/65 ASSEMBLER EDITOR

MAC/65 is the assembler for programmers who are serious about assembly language. MAC/65 is compatible with the Atari Assembler Editor, as long as you don't use MAC/65's powerful extra commands. It contains a speedy compiler and an excellent debugger.

$79, 16K cartridge. Optimized Systems Software, 1221B Kentwood Avenue, San Jose, CA, 95129. (408) 446-3099.

CIRCLE **200** ON READER SERVICE CARD

DEEP BLUE C

This C compiler code runs on other computers with only minor complications, making it one of the most transportable languages around. Faster than BASIC, Deep Blue C features pointers, recursive functions and high-level control functions. **Mathlib** ($19.95, AP0132) is a library of math functions designed to enable your Deep Blue C Compiler to do floating-point calculations.

$19.95. The Catalog, AP0114.

KYAN PASCAL

Kyan Pascal has all of the features of standard Pascal, the teaching and programming language widely used in colleges. Many of the Kyan Pascal programs you write on your Atari can run on the mainframe computers at your school or office. It comes with a built-in editor, native code compiler, macro assembler and a 300-page tutorial manual.

$69.95, 48K disk. Kyan Software, 1850 Union Street, Suite 183, San Francisco, CA 94123. (415) 626-2080.

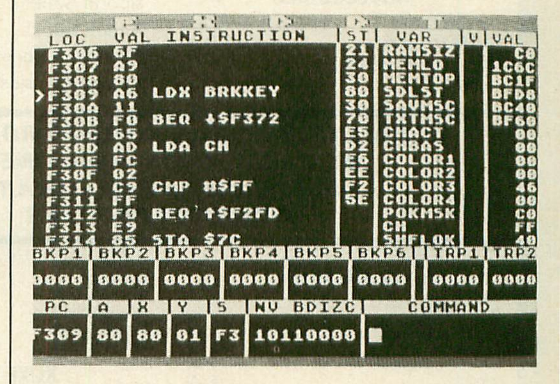
CIRCLE **201** ON READER SERVICE CARD

ADVAN BASIC

Never has a BASIC given the programmer such effortless command of the special sound and graphics capabilities of the Atari. Advan BASIC is a speedy compiled BASIC with powerful new commands and built-in Player/Missile graphics.

$39.95, 48K disk. Advan Language Designs, P.O. Box 159, Baldwin, KS 66006. (913) 594-3420.

CIRCLE **202** ON READER SERVICE CARD



EXTENDED D.D.T.

An outstanding assembly language debugger made better with a built-in mini-assembler, over 150 system symbols for more understandable disassembly, and the ability to deposit to graphic control areas without affecting the screen.

$15.95. The Catalog, AP0171.

FLOATING POINT PACKAGE

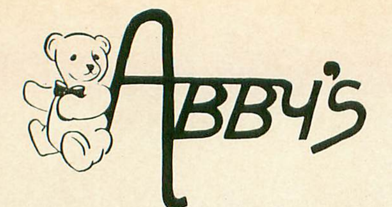
The new Floating Point Package works with the MAC/65 assembler from Optimized Systems Software. Ambitious assembly language programmers can now use the precision of floating point mathematics to create more powerful and accurate software.

$19.95, The Catalog, AP0186.

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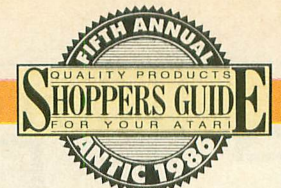
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CIRCLE 078 ON READER SERVICE CARD



Print Shop. Create designs and pictures with your KoalaPad or Atari Touch Tablet and compress all or part of your work into Print Shop format. The Print Preview feature lets you choose pattern fills and solid black or white to replace colors in the printout. Graphic Shop requires Broderbund's Print Shop.

$19.95, 48K disk. The Catalog, AP0156.



PRINT SHOP

Design your own greeting cards, banners, letterheads, logos and more with Broderbund's versatile Print Shop ($49.95). You don't need computer graphics experience: Print Shop will guide you through the process. Design elements include eight typestyles, nine border designs, a graphics editor that lets you create original pictures, and the ability to superimpose text over any design.

Volumes I, II & III of the **Print Shop Library** ($24.95 each) are collections of graphics, ranging from presidents to plumber's helpers, from chess pieces to choppers. These illustrations feed right into Print Shop.

The new **Print Shop Companion** ($49.95, 64K disk) adds calendars, enhanced borders, fonts and fill-in patterns to the basic program.

48K disk. Broderbund Software, 17 Paul Drive, San Rafael, CA 94903. (415) 479-1170.

CIRCLE **205** ON READER SERVICE CARD

PRINT WIZ

This printer dump mixes text and graphics for hard copies from most popular printers and can print sideways on a page. Print Wiz includes special handlers for popular graphics programs and can change type size directly from your keyboard.

$29.95, 16K disk. Allen Macroware, P.O. Box 2205, Redondo Beach, CA 90278. (213) 376-4105.

CIRCLE **206** ON READER SERVICE CARD

LISTER PLUS, PICTURE PLUS

Stretch your dot-matrix printer to its limits. Lister Plus dumps listed files (including programs) to the printer using any custom character set you choose. Picture Plus manipulates most types of picture files, so you can save them in standard files for use with a BASIC program, or dump them to the printer in any of four sizes.

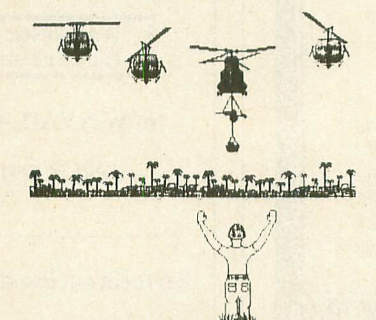
$19.95, 48K disk. The Catalog, AP0179.

MEGAFONT II+

MegaFont II+ is a lister program that has won many friends during its four years on the market. It speedily prints files that include graphics or Atari special characters. Megafont is compatible with popular paint programs and supports printers compatible with Epson, C. Itoh and Gemini 10X.

$25.95. 48K. XLEnt Software, P.O. Box 5228, Springfield, VA 22150. (703) 644-8881.

CIRCLE **220** ON READER SERVICE CARD

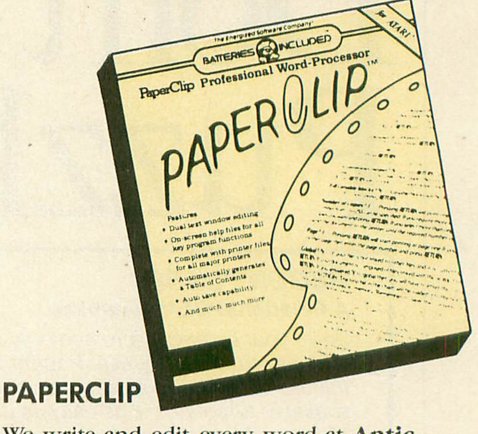


TYPESETTER ($34.95), PAGE DESIGNER ($29.95), RUBBER STAMP (29.95)

These three related programs form into a flexible and powerful package which lets you mix graphics and text elements that you have created from scratch. This software goes beyond Print Shop and Newsroom in control of the printed page. The array of powerful choices means that you have a lot of commands to learn.

XLEnt Software, P.O. Box 5228, Springfield, VA 22150. (703) 644-8881.

CIRCLE **207** ON READER SERVICE CARD



PAPERCLIP

We write and edit every word at **Antic** with PaperClip before transmitting the copy to our typesetter via modem. PaperClip is a professional-strength word processor that's easy to learn. Its features include a split screen with cut-and-paste between both windows, one-key macros, readable characters with true descenders, double-column printing, configuration files for several different printers and excellent documentation. A new version for the 130XE contains a spell checker.

$59.95, 48K disk. Batteries Included, 30 Mural Street, Richmond Hill, Ontario, L4B 1B5 Canada. (416) 881-9941.

CIRCLE **198** ON READER SERVICE CARD

ATARIWRITER+

A disk-based upgrade of the popular AtariWriter cartridge, AtariWriter+ now includes a spelling checker and mail merge, as well as allowing 130XE owners to take full advantage of their computers' full 128K memory. AtariWriter+ lets you send your file to devices other than "P:"—for instance, you might want to send it to the modem port or to another Atari computer.

$49.95, 48K disk. Atari Corp., 1196 Borregas Avenue, Sunnyvale, CA 94086. (408) 745-2000.

CIRCLE **183** ON READER SERVICE CARD

FIRST XLENT WORD PROCESSOR

First XLEnt Word Processor is powerful and feature-packed, but beginners can easily learn its basic functions and produce impressive results. The six most useful commands are always available at the bottom of the screen as icons, accessible via joystick or the keyboard. A simple printer driver maker construction set assures full control of your paper.

$29.95, 48K. XLent Software, P.O. Box 5228, Springfield, VA 22150. (703) 644-8881.

CIRCLE **220** ON READER SERVICE CARD

SOFTWARE



PRODUCTIVITY

INSYST!

InSyst! is aimed at the small businessman who needs a complete inventory tracking system. The program is written in compiled ACTION! for speed, but you do not need the ACTION! cartridge. The program allows—even encourages—the use of two drives. The manual is well-written and easy to understand. Includes an Edit/Add screen and Reports and Disk menus. Insyst! supports the 130XE RAMdisk.

$79.95, 48K disk. SoSoft Software, 2513E Sylvester Road, Albany, GA 31705. (912) 888-0821.

CIRCLE **213** ON READER SERVICE CARD

BUSINESS MANAGER

This is for the small businessman who needs a simple accounting system to track sales and inventory without getting lost in bells and whistles. Written in Atari BASIC, The Business Manager also runs with BASIC XL from OSS. This program takes advantage of the extra RAM in a 130XE.

$49.95, 48K Disk. Reeve Software, 29W150 Old Farm Lane, Warrenville, IL 60555. (312) 393-2317.

CIRCLE **214** ON READER SERVICE CARD

INVENTORY MASTER

This business inventory package allows 1,700 items per disk and has five-second retrieval, multiple vendor history and five standard reports. Up to 12-digit part numbers are supported. Purchase orders and product invoice reports automatically update the records.

$89.95, 48K disk. Royal Software, 2160 W. 11th Avenue, Eugene, OR 97402. (503) 683-5361.

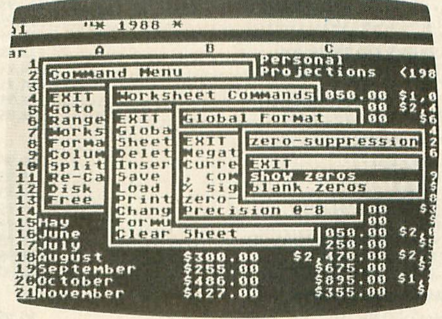
CIRCLE **215** ON READER SERVICE CARD

ELITE PERSONAL ACCOUNTANT

This personal finance package handles 79 categories divided into income, expense, asset and liability groups, and contains 17 different transaction codes. Its extensive HELP facilities are easily accessed without disturbing work in progress, and you can use three drives for data disks.

$48.95, 48K disk. Elite Software, 14897 Interurban Avenue S., #60, Seattle, WA 98168. (206) 246-5122.

CIRCLE **208** ON READER SERVICE CARD



CALC MAGIC

This spreadsheet is a complete package, featuring programmable macros enabling you to run automated sequences, the ability to quickly test multiple "what-if" conditions, pop-up menu windows and several math functions, including mean, standard deviation and variance. Standard spreadsheet .DIF files are supported.

$24.95, XL or XE and disk. The Catalog, AP0177.

MICROMOD

This software defies categorization. It's not just a record-keeping program, but it does the job well. It's not a real inventory program, but it can be with extra modules available from version 3.0. Its power lies in the record-design function providing a package which can be used to track most or all of a small business' records.

$79.95, six 48K disks. Micromiser Inc., 1635-A Holden Avenue, Orlando, FL 32809. (305) 857-6014.

CIRCLE **212** ON READER SERVICE CARD

B/GRAPH

B/Graph creates pie charts, 2-D and 3-D bar charts, line and area graphs. You can graph three factors with 100 data points each and convert instantly between graph types without re-entering data. B/Graph also reads and writes to VisiCalc .DIF files—enter data with VisiCalc, then graph it with B/Graph.

$39.95, 48K disk. Batteries Included, 30 Mural Street, Richmond Hill, Ontario L4B 1B5, Canada. (416) 881-9941.

CIRCLE **198** ON READER SERVICE CARD

MILES PAYROLL SYSTEM

This advanced, comprehensive payroll accounting system maintains cumulative totals for up to 50 employees per disk and features complete reporting, check writing and W-2 reporting. Covers all standard payroll deductions, unemployment insurance and worker's compensation. Easy to update for yearly IRS changes, the Miles package allows weekly, biweekly, semimonthly or monthly pay periods.

$99.95, 32K disk, requires two disk drives. Miles Computing, 21018 Osborne Street, Building 5, Canoga Park, CA 91304. (818) 341-1411

CIRCLE **218** ON READER SERVICE CARD

MUSIC

MUSIC STUDIO

This easy-to-use music composer will have you playing songs on your Atari within minutes. The Music Studio has five screens from which to compose, edit and play music back. Up to three lines of lyrics can be added to scroll right along with your musical score. Other features include transposition, inserting, copying and moving blocks of music—much like working with word processors. You have a choice of 15 instruments, ranging from flute to drums.

$34.95. Activision Inc., P.O. Box 7287, Mountain View, CA 94039. (415) 960-0410.

CIRCLE **216** ON READER SERVICE CARD

MUSIC PAINTER

With Music Painter, you can play three different voices at a time. Colored lines placed on a musical staff with your joystick represent notes. You can play the music forward or backward, insert or delete spaces, and copy blocks of music anywhere within the song.

$19.95, 48K disk. Atari Corp., 1196 Borregas Avenue, Sunnyvale, CA 94086. (408) 745-2000.

CIRCLE **182** ON READER SERVICE CARD

MIDIMATE

The MIDIMATE series of hardware and software from Hybrid Arts are professional MIDI sequencers that can control a bank of synthesizers. The MidiTrack II uses your Atari to emulate a 16-track digital recorder with synchronizer and MIDI remote control. There's 16-track overdubbing, autolocate and optimizing.

MIDIMATE Interface Box: $199.50; MidiTrack II Software, $149.50. Hybrid Arts, 11928 W. Olympic Blvd., Los Angeles,CA 90064. (213) 826-3777.

CIRCLE **217** ON READER SERVICE CARD



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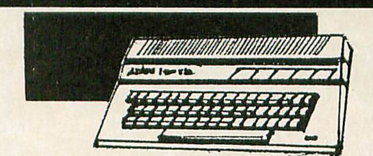
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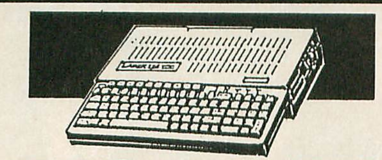
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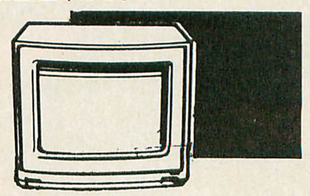
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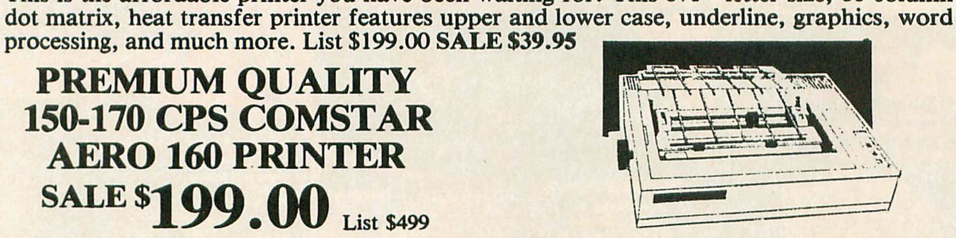
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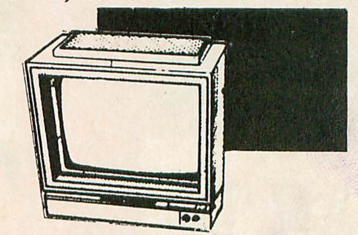
This is the affordable printer you have been waiting for! This 8½'' letter size, 80 column dot matrix, heat transfer printer features upper and lower case, underline, graphics, word processing, and much more. List $199.00 **SALE $39.95**



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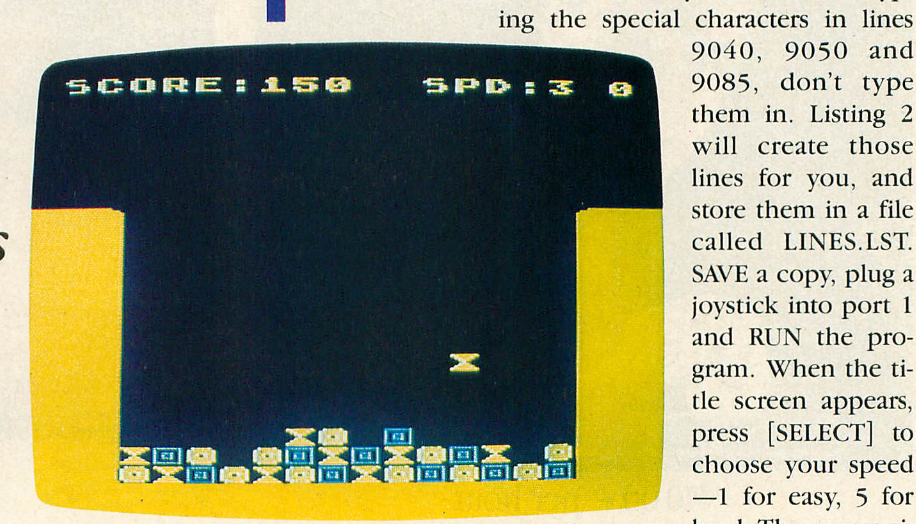
And, since it's the Season, we have a gift for **you** when you order: The Best of Antic, an anthology of the best games, articles and programs from earlier Antics.

BY JAMES HAGUE

Uncle Henry's Nuclear Waste Dump

Be careful with those toxic cans

"I hope you've got insurance," says Uncle Henry as you don your yellow rubber suit. Dump the nuclear waste and make that old cuss rich. Be very careful and you may live through it. This BASIC program works on all 8-bit Atari computers of any memory size, with disk or cassette.



That falling can of nuclear waste may land safely this time, but don't count on safe landings for long. Better get used to bombastic explosions.

Uncle Henry is always trying to make a fast buck, so when he discovered that thousands of corporations desperately needed a place to dispose of their nuclear waste, he started thinking. When Uncle Henry starts thinking, something bizarre usually follows.

And it did! After six months of brainstorming, Uncle Henry celebrated the grand opening of his Nuclear Waste Dump. Hidden behind the local Sloppy Joe Hut, the waste dump was designed to handle vast quantities of discarded radioactive material.

Soon Uncle Henry was rolling in dough, but there was too much waste for one man to handle. So he put an ad in the local paper—which of course you answered.

DUMPING IT

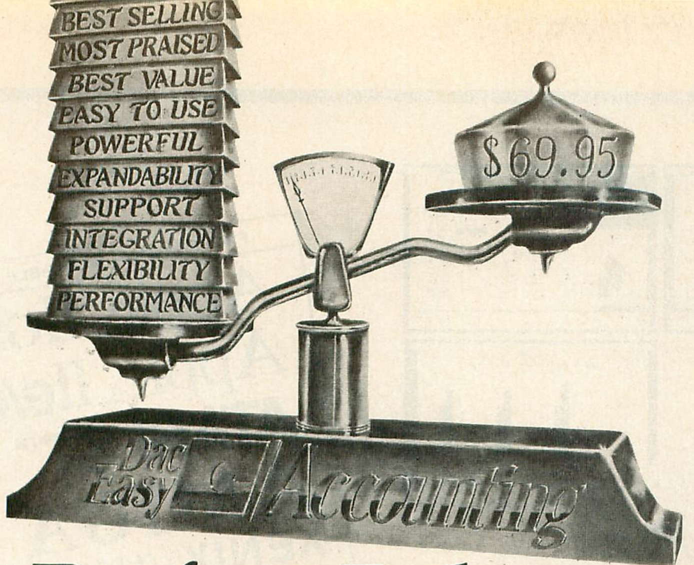
Your first task is to type in Listing 1, NUCWASTE.BAS, checking each line with TYPO II. If you have trouble typing the special characters in lines 9040, 9050 and 9085, don't type them in. Listing 2 will create those lines for you, and store them in a file called LINES.LST. SAVE a copy, plug a joystick into port 1 and RUN the program. When the title screen appears, press [SELECT] to choose your speed —1 for easy, 5 for hard. Then press either [START] or the fire button to begin.

The Nuclear Waste Dump employs the most advanced method of waste disposal known to man—dumping the stuff in a pit. You stand on the edge of the pit. Uncle Henry hands you a container of nuclear waste, which you maneuver above the pit with the joystick. Press the button to drop it. The can falls into the pit and bounces along the pile of waste until it comes to rest. Simple, right? Well, almost . . .

There are three types of waste containers, each having its own distinct shape and color. The catch is that a container may not end up on or next to a container of the same type. If it does, POW—the end of your little corner of the world!

Momentary contact between containers of similar waste *is* allowed. For example, a container of Type 1 waste

continued on page 53



Perfect Balance

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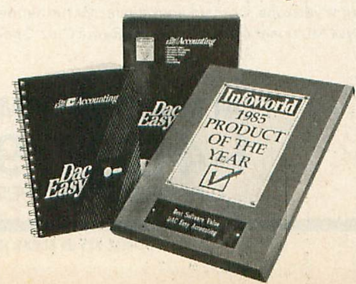
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Minimum hardware requirements
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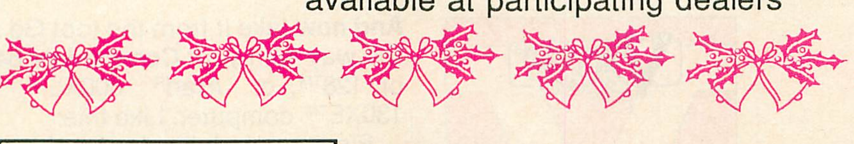
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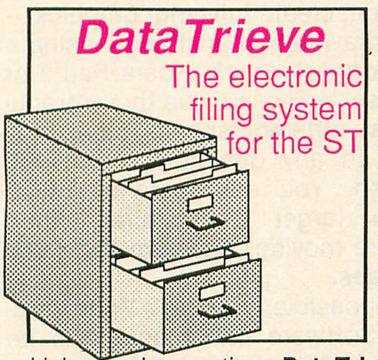
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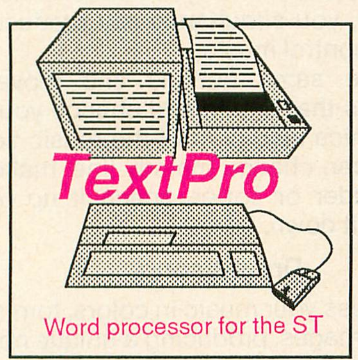
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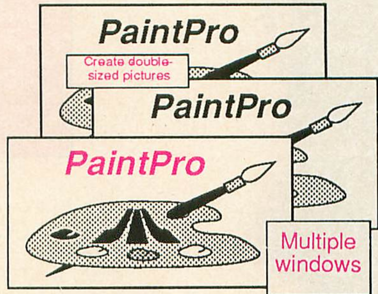




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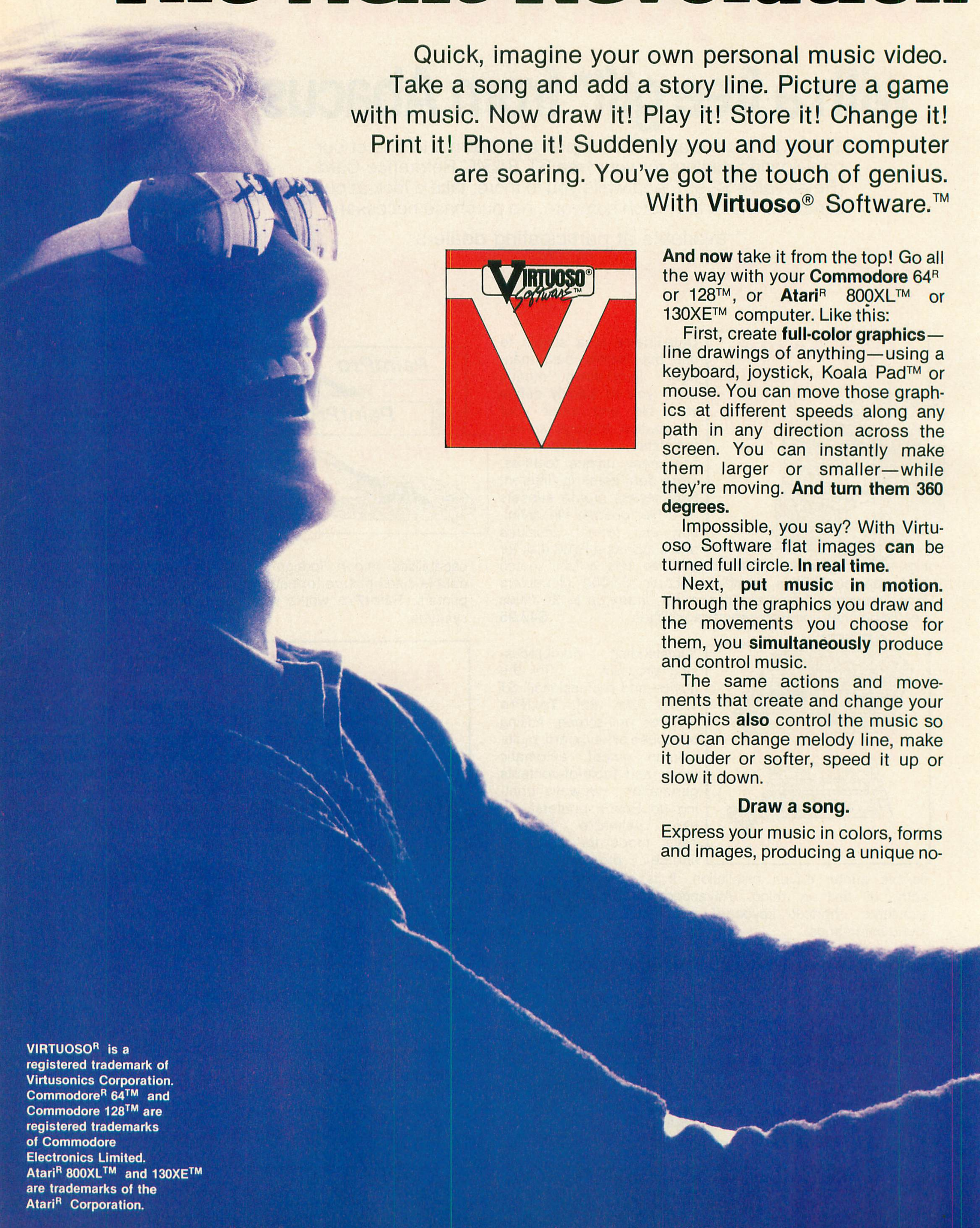
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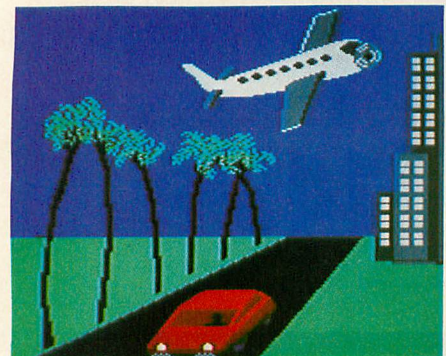
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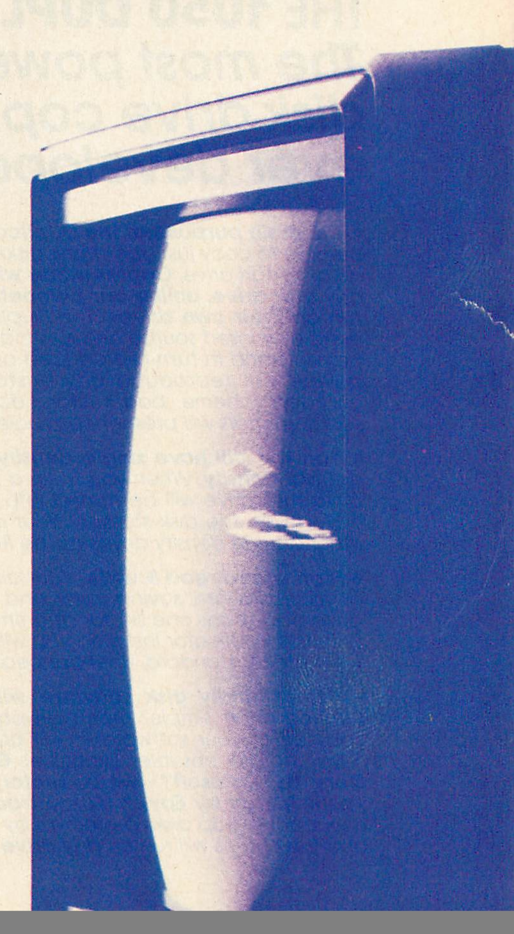
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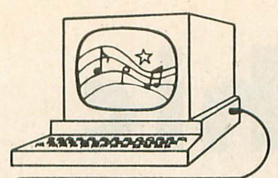
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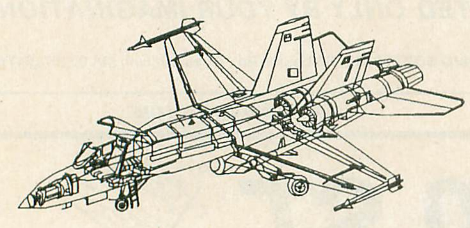
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*S.R,.P,0.N,ML,K.J,I.H,GG.FF,,EEE,,FF.GG,H.I,J.K,LM,N.0,P.,R.S*
 S.R,Q.P,0N,M.L,K.J,I..H,GG..FFFFF..GG,HH.I,J.K,L.M,N0,P.Q,R.S
 ,S.R,.P,0.N,M.L,K.J,,I.HH,,GGGGGGG,,HH.I,,J.K,L.M,N.0,P.,R.S,
 TS.R,Q.P,0.N,M.L,KK.J,II..HHHHHHHHH..II,J..K,L.M,N.0,P.Q,R.ST
 T,S.R,Q.P,0.N,M.LL,K..J,,IIII...IIII,,J..K,LL.M,N.0,P.Q,R.S,T
*.T,S.R,Q.P,0.N,,M.L,,KK..JJJ,,,,,JJJ..KK,,L.MM,N.0,P.Q,R.S,T.*
 U.T,S.R,Q.P,0..N,MM.LL,,KKK.......KKK,,LL.MM,N..0,P.Q,R.S,T.U
 ,U.T,S.R,Q.PP,0.NN,MM..LLL,,,,,,,,,LLL..MM,NN.0,,P.Q,R.S,T.U,
 V,U.T,S.R,QQ.P,00.NN,,MMM.....L.....MMM,,NN.00,P.QQ,R.S,T.U,V
 .V,U.T,S..R,Q..P,,0..NNN,,,,MMMMM,,,,NNN..0,,P..Q,RR.S,T.U,V.
*W.V,U.T,,S.R,,Q..PP,,00...NNNNNNNNN...00,,PP..Q,,R.S,,T.U,V.W*
 ,W.V,UU.T,SS.R,,QQ..PP,,,00000000000,,,PP..QQ,,R.SS,T..U,V.W,
 X,W.VV,U.TT,SS.RR,,QQ...PPPPPPPPPPPPP...QQ,,RR.SS,TT.U,VV.W,X
 .X,WW.V,,U.TT,SS..RR,,,QQQQQ....QQQQQ,,,RR..SS,TT.U,,V.WW,X.
 Y..X,W..V,,U..T,,SSS..RRRR,,,,,,,,,RRRR..SSS,,T..U,,V..W,X..Y
*Z,Y.XX,W..V,,UU..TT,,SSSS............SSSS,,TT..UU,,V..W,XX.Y,,*
 *    *    *    *    *    *    *    *    *    *    *    *    *
```

Z=SQR(X*X+Y*Y)

Turn complicated math functions into easy-to-read graphs that double as moire art. This BASIC program runs on all 8-bit Atari computers, with disk or cassette. An 80-column printer is required.

BY JAMES PIERSON-PERRY

One of the more useful ways to study mathematical relationships is through graphics. Plotting a function usually gives a greater intuitive grasp of how the variables interact with each other. For example, a drawing of a sphere is much easier to comprehend than the function Z=SQR(R*R-X*X-Y*Y).

Response surface mapping is another way of representing 3-D functions and is widely used for scientific applications. These maps are also called "contour plots" because they resemble the contour lines on topographic land maps. RSMAP generates response surface maps for BASIC functions having one or two variables (X and Y). Analytical uses aside, many such graphs are interesting simply for their visual appeal.

In view of this, it is not surprising that 3-D graphics plotting is a popular software application. Examples of these include Paul Chabot's *GRAPH 3-D* (**Antic**, October 1985) for 8-bit Ataris, and Tom Hudson's *CAD 3-D* for the ST ($49.95. The Catalog, ST0214). Programs like these let you

continued on next page

create, manipulate and print 3-D images of functions.

Response surface maps use colors or symbols to represent the Z (response) value, rather than plotting the third dimension in perspective. A weather map is a good example of a response surface map. Here, one type of symbol represents low pressure areas, while another symbol represents high pressure areas.

BACKGROUND

Most 3-D plotting programs give the illusion of three dimensions on a flat surface. The resulting image is greatly dependent on the viewing angle and may hide important parts of the function. Response surface mapping programs always look "down" at the function, along the Z-axis. This gives the entire X,Y grid as the viewing field.

The computer evaluates the function at each point on the grid and prints a letter corresponding to the resulting response value. We can extend this technique to examine functions having more than two variables. For example, consider the function Z=X*X+Y*Y+W*W. We can make a separate map at various fixed values of W (called "slices") which, when viewed in sequence, give a good picture of what the overall function looks like.

THE PROGRAM

Type in Listing 1, RSMAP.BAS, check it with TYPO II and SAVE a copy before RUNning it.

When RUN, RSMAP displays a title screen, then pauses and waits for you to type in your function. All standard BASIC arithmetic operators and transcendental functions are allowed. Constants such as PI and E also may be used. You may define any of your own constants in line 1270. (NOTE: Embedded logic operators for discontinuous functions are not allowed.)

Here are some sample functions:

Z=X*X+Y*Y*PI
Z=LOG(ABS(X))+LOG(ABS(Y))/E
Z=ABS(COS(X)+COS(Y))

If BASIC detects any errors, you'll be asked to re-enter the function.

Next, enter the boundaries for the X and Y axes (even if only one variable is used) and the response limits. Estimates of the response minimum and maximum values are automatically generated to guide you in selecting the response limits. These limits will determine the resolution of the map.

Your Atari will now print the response map, along with a key to the response symbols. A typical map takes from two to five minutes to print. Press the [OPTION] key to abort the printout and enter new parameters.

Here are some additional interesting functions to get you started:

1. Z=LOG(ABS(X))+LOG(ABS(Y))
   X,Y Ranges=−3 to 3
   Z Range=−6.5 to 2.5
2. Z=SQR(5-X*X-Y*Y)
   X,Y Ranges=−1.5 to 1.5
   Z Range=0 to 2.5
3. Z=COS(X)+COS(Y)
   X,Y Range=−3.14 to 3.14
   Z Range=−180 to 180

PROGRAM TAKE-APART

The heart of the map processing is the short subroutine located at the very start of the program to speed execution time.

Lines 1090-1190: Subroutine to evaluate the function over the X,Y grid and translate response values into map symbols. The symbols are stored

```
 *    *    *    *    *    *    *    *    *    *    *    *    *
*AAAA,,B.C,D.E,.G,.I,J.K,L..MMM,MMM..L,K.J,I.,G.,E.D,C.B,,AAAA*
 AAAA,,B.C,D.EF.G,.I,JK,,L.MMM,,,MMM.L,,KJ,I.,G.FE.D,C.B,,AAAA
 AAA,,BB.C,DE,F.,H.IJ.K,L..M,,,,,,,M..L,K.JI.H,.F,ED,C.BB,,AAA
 ,,,,B..C,D.E,.G,.I,JK,L..M,,NNNNN,,M..L,KJ,I.,G.,E.D,C..B,,,,
 BBBB.CC,D.E,.G,HI,J.,L.M,,NN.....NN,,M.L,.J,IH,G.,E.D,CC.BBBB
*...CC,DD.E,.G,HI,JK,L.M,NN.OOOOOOO.NN,M.L,KJ,IH,G.,E.DD,CC...*
 ,,,,DD.E,F.G,.I,JK,L.,NN.O,,,PPP,,,O.NN,.L,KJ,I.,G.F,E.DD,,,,
 DD...E,FF.,H.IJ.K,.M,N.O,PP.......PP,O.N,M.,K.JI.H,.FF,E...DD
 EEE,,F..G,HI,J.,L.,N.O,P..Q,,,,,,,Q..P,O.N,.L,.J,IH,G..F,,EEE
 FFF..GG,H.I,.K,.M,NO,P.Q,,RR.....RR,,Q.P,ON,M.,K.,I.H,GG..FFF
*GGG,,HH.I,J.,L.,N.OP.Q,R..SS,,,,,SS..R,Q.PO.N,.L,.J,I.HH,,GGG*
 HHH..II,J.K,.M,NO,PQ,R.S,,TT.....TT,,S.R,QP,ON,M.,K.J,II..HHH
 IIII,JJ.K,L.,N.OP.Q,.S,TT.UU,,,,,UU.TT,S.,Q.PO.N,.L,K.JJ,IIII
 JJJJ..K,L.M,NO,P.,R.ST..U,VVV...VVV,U..TS.R,.P,ON,M.L,K..JJJJ
 ..KKK,L..,N.O,.Q,RS,T.U,V..WWWWWWW..V,U.T,SR,Q.,O.N,..L,KKK..
*,,,,L..M,N.O,.Q,.S,TU,V..W,,XXXXX,,W..V,UT,S.,Q.,O.N,M..L,,,,*
 LLL..M,,N.OP.Q,.S,TU,V.W,,X.......X,,W.V,UT,S.,Q.PO.N,,M..LLL
 ...MM,NN.O,.Q,RS,TU,V.W,XX.YYYYYYY.XX,W.V,UT,SR,Q.,O.NN,MM...
 MMM,,NN.O,P.,R.ST.U,.W,X..YY,,,,,YY..X,W.,U.TS.R,.P,O.NN,,MMM
 MM,,,N.OO,.Q,RS,T.,V.W,X.YY,,,,,,,YY.X,W.V,.T,SR,Q.,OO.N,,,MM
*,,,,NN.O,P.Q,RS,TU,V.W,X.YY,,,Z,,,YY.X,W.V,UT,SR,Q.P,O.NN,,,,*
 MM,,,N.OO,.Q,RS,T.,V.W,X.YY,,,,,,,YY.X,W.V,.T,SR,Q.,OO.N,,,MM
 MMM,,NN.O,P.,R.ST.U,.W,X..YY,,,,,YY..X,W.,U.TS.R,.P,O.NN,,MMM
 ...MM,NN.O,.Q,RS,TU,V.W,XX.YYYYYYY.XX,W.V,UT,SR,Q.,O.NN,MM...
 LLL..M,,N.OP.Q,.S,TU,V.W,,X.......X,,W.V,UT,S.,Q.PO.N,,M..LLL
*,,,,L..M,N.O,.Q,.S,TU,V..W,,XXXXX,,W..V,UT,S.,Q.,O.N,M..L,,,,*
 ..KKK,L..,N.O,.Q,RS,T.U,V..WWWWWWW..V,U.T,SR,Q.,O.N,..L,KKK..
 JJJJ..K,L.M,NO,P.,R.ST..U,VVV...VVV,U..TS.R,.P,ON,M.L,K..JJJJ
 IIII,JJ.K,L.,N.OP.Q,.S,TT.UU,,,,,UU.TT,S.,Q.PO.N,.L,K.JJ,IIII
 HHH..II,J.K,.M,NO,PQ,R.S,,TT.....TT,,S.R,QP,ON,M.,K.J,II..HHH
*GGG,,HH.I,J.,L.,N.OP.Q,R..SS,,,,,SS..R,Q.PO.N,.L,.J,I.HH,,GGG*
 FFF..GG,H.I,.K,.M,NO,P.Q,,RR.....RR,,Q.P,ON,M.,K.,I.H,GG..FFF
 EEE,,F..G,HI,J.,L.,N.O,P..Q,,,,,,,Q..P,O.N,.L,.J,IH,G..F,,EEE
 DD...E,FF.,H.IJ.K,.M,N.O,PP.......PP,O.N,M.,K.JI.H,.FF,E...DD
 ,,,,DD.E,F.G,.I,JK,L.,NN.O,,,PPP,,,O.NN,.L,KJ,I.,G.F,E.DD,,,,
*...CC,DD.E,.G,HI,JK,L.M,NN.OOOOOOO.NN,M.L,KJ,IH,G.,E.DD,CC...*
 BBBB.CC,D.E,.G,HI,J.,L.M,,NN.....NN,,M.L,.J,IH,G.,E.D,CC.BBBB
 ,,,,B..C,D.E,.G,.I,JK,L..M,,NNNNN,,M..L,KJ,I.,G.,E.D,C..B,,,,
 AAA,,BB.C,DE,F.,H.IJ.K,L..M,,,,,,,M..L,K.JI.H,.F,ED,C.BB,,AAA
 AAAA,,B.C,D.EF.G,.I,JK,,L.MMM,,,MMM.L,,KJ,I.,G.FE.D,C.B,,AAAA
*AAAA,,B.C,D.E,.G,.I,J.K,L..MMM,MMM..L,K.J,I.,G.,E.D,C.B,,AAAA*
 *    *    *    *    *    *    *    *    *    *    *    *    *
```

Z=COS(X)+COS(Y)

```
 *    *    *    *    *    *    *    *    *    *    *    *    *
*YY....XXXX,,WWW..VV,UU.T,.,,A,,.,T.UU,VV..WWW,,XXXX....YY*
 Y....XXXX,,WWW..VV,,U..TS.Q,A,Q.ST..U,,VV..WWW,,XXXX....Y
 ....XXXXX,,WWW...VV,,U.T,SRQOAOQRS,T.U,,VV...WWW,,XXXXX....
 ...XXXX,,,WWW...VV,,UU.T,SRQOAOQRS,T.UU,,VV...WWW,,,XXXX...
 .XXXXX,,,WWW...VV,,UU.TT,.RQOAOQR.,TT.UU,,VV...WWW,,,XXXXX.
*XXXX,,,WWWW...VVV,,UU.T,S.,..A..,.S,T.UU,,VVV...WWWW,,,XXXX*
 XX,,,,WWWW...VVV,,UU.TT,S.,..A..,.S,TT.UU,,VVV...WWWW,,,,XX
 ,,,,,WWWW....VVV,,UU..T,S.R,P.A.P,R.S,T..UU,,VVV....WWWW,,,,,
 ,,,WWWWW...VVV,,UU..TT,S.RQPNANPQR.S,TT..UU,,VVV...WWWWW,,,
 WWWWW.....VVV,,UU..TT,SS.,Q,NAN,Q,.SS,TT..UU,,VVV.....WWWWW
*WWW....VVVV,,UUU..TT,,S.R,.,,A,,.,R.S,,TT..UUU,,VVVV....WWW*
 .....VVVV,,,UUU..TT,,S.R,Q.OMAMO.Q,R.S,,TT..UUU,,,VVVV.....
 ..VVVV,,,UUUU..TTT,,S..R,QPOMAMOPQ,R..S,,TTT..UUUU,,,VVVV..
 VVV,,,,UUU...TTT,,SS..R,Q.,..A..,.Q,R..SS,,TTT...UUU,,,,VVV
 ,,,,UUUU....TTT,,SSS.RR,Q.PONLALNOP.Q,RR.SSS,,TTT....UUUU,,,,
*UUUU....TTTT,,SS...R,,Q.P,.,,A,,.,P.Q,,R...SS,,TTTT....UUUU*
 ..TTTTT,,,SSS...RR,,QQ.P,ONMKAKMNO,P.QQ,,RR...SSS,,,TTTTT..
 ,,,,SSSSS...RRR,,QQ..P,O.NMLJAJLMN.O,P..QQ,,RRR...SSSSS,,,,
 ...RRRRR,,QQQQ..PP,,OO.N,MLKIAIKLM,N.OO,,PP..QQQQ,,RRRRR...
 ....PPPP,,,OOO...NN,MM.L,KJIGAGIJK,L.MM,NN...OOO,,,PPPP....
*AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA*
 ....PPPP,,,OOO...NN,MM.L,KJIGAGIJK,L.MM,NN...OOO,,,PPPP....
 ...RRRRR,,QQQQ..PP,,OO.N,MLKIAIKLM,N.OO,,PP..QQQQ,,RRRRR...
 ,,,,SSSSS...RRR,,QQ..P,O.NMLJAJLMN.O,P..QQ,,RRR...SSSSS,,,,
 ..TTTTT,,,SSS...RR,,QQ.P,ONMKAKMNO,P.QQ,,RR...SSS,,,TTTTT..
*UUUU....TTTT,,SS...R,,Q.P,.,,A,,.,P.Q,,R...SS,,TTTT....UUUU*
 ,,,,UUUU....TTT,,SSS.RR,Q.PONLALNOP.Q,RR.SSS,,TTT....UUUU,,,,
 VVV,,,,UUU...TTT,,SS..R,Q.,..A..,.Q,R..SS,,TTT...UUU,,,,VVV
 ..VVVV,,,UUUU..TTT,,S..R,QPOMAMOPQ,R..S,,TTT..UUUU,,,VVVV..
 .....VVVV,,,UUU..TT,,S.R,Q.OMAMO.Q,R.S,,TT..UUU,,,VVVV.....
*WWW....VVVV,,UUU..TT,,S.R,.,,A,,.,R.S,,TT..UUU,,VVVV....WWW*
 WWWWW.....VVV,,UU..TT,SS.,Q,NAN,Q,.SS,TT..UU,,VVV.....WWWWW
 ,,,WWWWW...VVV,,UU..TT,S.RQPNANPQR.S,TT..UU,,VVV...WWWWW,,,
 ,,,,,WWWW....VVV,,UU..T,S.R,P.A.P,R.S,T..UU,,VVV....WWWW,,,,,
 XX,,,,WWWW...VVV,,UU.TT,S.,..A..,.S,TT.UU,,VVV...WWWW,,,,XX
*XXXX,,,WWWW...VVV,,UU.T,S.,..A..,.S,T.UU,,VVV...WWWW,,,XXXX*
 .XXXXX,,,WWW...VV,,UU.TT,.RQOAOQR.,TT.UU,,VV...WWW,,,XXXXX.
 ...XXXX,,,WWW...VV,,UU.T,SRQOAOQRS,T.UU,,VV...WWW,,,XXXX...
 ....XXXXX,,WWW...VV,,U.T,SRQOAOQRS,T.U,,VV...WWW,,XXXXX....
 Y....XXXX,,WWW..VV,,U..TS.Q,A,Q.ST..U,,VV..WWW,,XXXX....Y
*YY....XXXX,,WWW..VV,UU.T,.,,A,,.,T.UU,VV..WWW,,XXXX....YY*
 *    *    *    *    *    *    *    *    *    *    *    *    *
```

Z=LOG(ABS(X))+LOG(ABS(Y))

in a buffer (B$) and printed one line at a time.

Lines 1240-1290: Initialize variables and strings. Current color register values are saved and restored at the end of the program.

Lines 1630-1800: Entry of the plotting function. We use the Atari's "forced-read" mode to install the function into the program.

Analytical uses aside, many such graphs are interesting simply for their visual appeal.

Lines 1830-1890: Input X,Y boundaries and ensure the minimum value is less than the maximum value.

Lines 1910-2030: Routine to estimate minimum and maximum values of Z. A TRAP here prevents errors from illegal BASIC math operation, such as LOG(0).

Lines 2260-2410: Generate the response surface map.

Lines 2430-2510: Allow you to generate a new map using the same function but different ploting parameters.

NEXT STEP

Ambitious readers may want to modify this program to plot functions on a graphics screen instead of a printer. **Antic** would be glad to see a short, elegant enhancement which would support Graphics 15 (ANTIC Mode E), Graphics 7 or any of the GTIA modes.

James Pierson-Perry of Elkton, Maryland is a research chemist with DuPont. His Molecular Weight Calculator *program appeared in* ***Antic****, May 1986. Pierson-Perry was introduced to Atari computers in 1982 when his daughter's school began using them.*

Listing on page 110

REVIEWED BY GREGG PEARLMAN, ANTIC JUNIOR EDITOR

Two New Atari Printers

Good deal at $219.95

Left: a digitized Churchill printed by Atari's new XMM801 (above). Opposite from top: the ST hi-res bee printed by the SMM804. Atari Planetarium world map printed by the XMM801. Text sample from SMM804.

Atari's long-awaited **XMM801** and **SMM804** dot-matrix printers are solidly in the tradition of previous Atari printers. They offer many (but not all) of the features currently considered standard in the marketplace. And they are priced attractively less than the competition—available as low as $199.97 as we go to press.

In most respects, both new printers are identical. The XMM801 has a serial interface that plugs directly into 8-bit Atari computers or their disk drives. The SMM804 has a faster parallel interface and is intended for direct hookup to STs. But it can be connected to 8-bit models via the Atari 850 Interface Module or ICD's new P:R: Connection. In fact, if you already own an interface and are considering buying an ST, the SMM804 will give you more speed and features than the identically-priced XMM801.

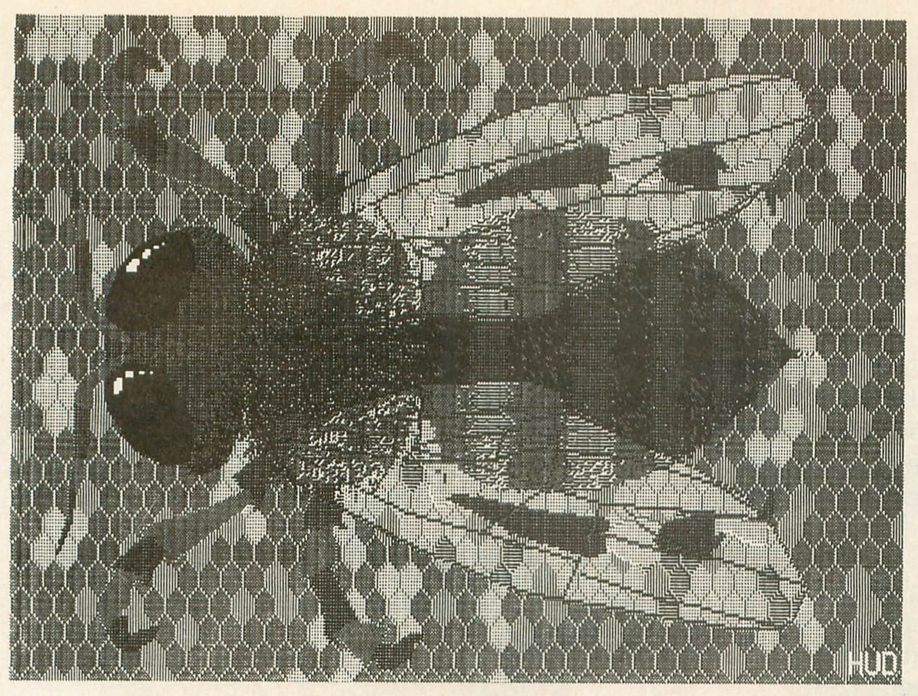
The XMM801 is compatible with Epson's medium-resolution graphics mode, 960 dots per line. The SMM804 supports as many as 1,280 dots per line. Both were designed to be as Epson-compatible as possible, but they are also fully compatible with the old Atari 825 printer and were primarily designed primarily as a new, improved 825.

The printers are easy to set up and operate, and they both have quick self-test routines. Paper is easy to load and, unlike other printers, the XMM801 and SMM804 don't waste a sheet of paper while setting up to start printing at the top of the next page.

Detailed, readable documentation is provided for each printer. The XMM801 has a 73-page manual while the SMM804 covers 117 pages. This size difference is mostly due to 25 pages of multi-national control code tables for the ST printer.

Both printers use the same type of ribbon cartridge, and it's easy to change—just pull straight up and out, and snap in a new one. Atari's own ribbons should be available from dealers who sell the printers, or directly by mail from Atari at approximately $12.95 each.

However, when **Antic** checked for additional ribbon sources, we discovered that the XMM/SMM ribbon is compatible with easily-found ribbons used by the Commodore 1526 and the Mannesman-Tally Spirit 80. The sample printouts accompanying this article were made on a Pelikan P-116 ribbon we purchased for $8.95. The P-116 was a bit tricky to load properly, but it seemed to print darker and more evenly than the Atari ribbons.





GRAPHICS COMPATIBILITY

Text printouts look virtually the same on both printers, except that the 8-bit model does not produce italics. Neither model has a near-letter-quality mode, but their regular text printing is not bad at all.

Both printers are capable of producing detailed graphics, under standard Epson printer drivers. However, software compatibility varies *widely*. Here are our first results:

On the XMM801, our Atari Planetarium world map and star chart printouts were every bit as good as those from our Star Micronics SG-10. The XMM801 did a respectable job on a digitized photo of Winston Churchill. However, we could *not* get the XMM801 to work with Lister Plus from the The Catalog—or with Broderbund's Print Shop. (According to Broderbund Software, Print Shop has never worked with Atari printers, but they had not yet tested the XMM801 as we went to press.)

The SMM804 generally did justice to the graphics capabilities of ST computers. In a sort of "blind taste test," everyone we questioned at **Antic** preferred the SMM804 rendering of "Stoneage," Darrel Anderson's DEGAS Art Competition winner (**Antic**, July 1986) over that from our in-house Epson FX-85. The SMM804 also turned out accurate dumps of game screens from Epyx's Winter Games and Rogue and Activision's Hacker II.

On the other hand, Tom Hudson's well-known ST Bee screen showed more black-and-white detail on the Epson printout. And in ST desktop screen dumps, white lines were slightly more noticeable on the Atari printouts than on the Epson copies.

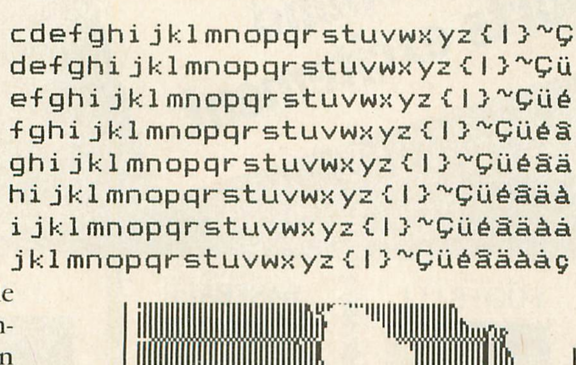
Two other Activision ST screen dumps gave different results. When printing a fill pattern from Audio Light's Paintworks, our results were accurate but inconsistent in density. When we tried to print a musical staff from Music Studio, the SMM804 added an extra line-feed after each line. However, Activision said that a fix for Music Studio was in the works. PCBoard Designer from Abacus Software also gave extra line feeds.

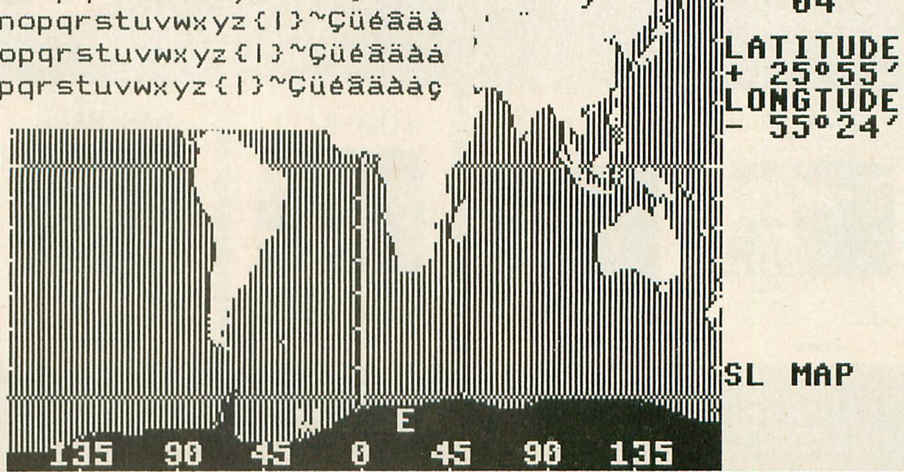
SPEED TEST

Both printers are bi-directional, but neither is incredibly fast. On an 800XL with an 850 interface, we compared the print speeds of six printers: the Atari XMM801 and SMM804, Epson FX-85, the Star SG-10 and new NL-10 and the Axiom (Seikosha) GP-550AT. The XMM801 and Seikosha both had serial hookups, while the other four used parallel connections.

We printed a 20,000-character

continued on next page





Your Ticket To The Best In Sports

When was the last time you had the chance to attend a championship sporting event–or better yet, play in one? Gamestar's series of outstanding sports simulations gives you that chance. Make the playoffs. Play in the final round at Pebble Beach. Fight the heavyweight champ for the title.

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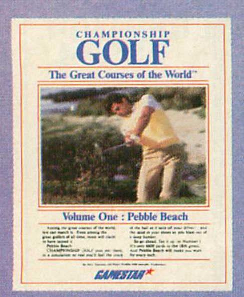
For the very best in sports–the excitement, the challenge, even the championship–Gamestar is your ticket.

Section 1 Row A Seat 1
BOX SEAT RESERVED
GAMESTAR Championship Series

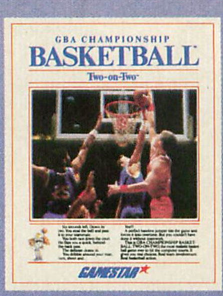
Admit all to year-round sports excitement

Ask your retailer about our HOT HOLIDAY OFFERS worth $245.

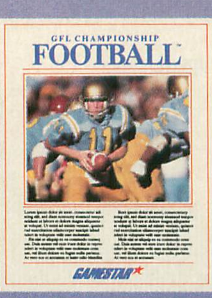
GAMESTAR



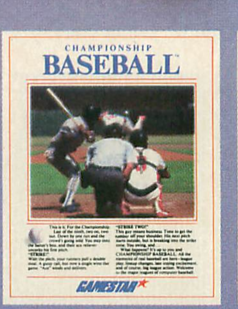
Available for IBM PC, PCjr and Tandy 1000, Commodore Amiga, and compatible computer systems. Coming soon for Apple II, Atari ST and compatible computer systems.



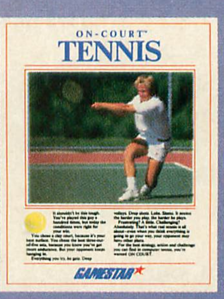
Available for Apple II, IBM PC, PCjr, and Tandy 1000, Commodore 64, 128, and Amiga, Atari ST, and compatible computer systems.



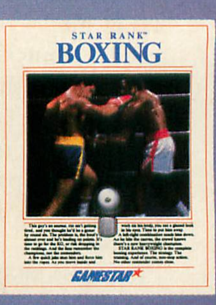
Available for Apple II, IBM PC, PCjr, and Tandy 1000, Commodore 64, 128, and Amiga, Atari ST, and compatible computer systems.



Available for Apple II, IBM PC, PCjr, and Tandy 1000, Commodore 64, 128, and Amiga, Atari ST, and compatible computer systems.



Available for Commodore 64 and 128 computer systems.



Available for Commodore 64 and 128 computer systems.

CIRCLE 081 ON READER SERVICE CARD

NUCLEAR WASTE
continued from page 35

may be dropped onto another Type 1 container as long as it bounces to a different location and does not come to rest in contact with Type 1 waste.

Also, you can only hold a can for a short time (depending on which speed you selected). When you are handed a can, a timer in the upper right-hand corner of the screen counts down. When it reaches zero, a buzzer sounds and you must drop the waste in your tracks. Needless to say, this could be disastrous.

You get 10 points for every container successfully dumped. If you manage to fill the pit by placing just one container of waste as high as the pit's rim, you get a 1,000-point bonus, some neat special effects and an early retirement. If only it were that easy. . .

DESIGNER'S NOTES

Surviving Uncle Henry's Nuclear Waste Dump does not depend solely on your reflexes, but also on quick, logical decisions. Speed 1 allows quite a bit of time to decide where to drop the waste, while Speed 5 only gives you a split second. Plan ahead, because each move may drastically affect subsequent moves.

The game may seem simple at first, but as the pit fills up, you must consider the physics of how each container will react when it hits the pile, which makes things extremely tricky. Only by playing can you learn. But here's a tip: if a container has the choice of falling left or right, it will always go left. And as you play, you will be treated periodically to words of wisdom from Uncle Henry himself.

Now get back to work. Uncle Henry is counting on you. Good help is hard to find.

James Hague lives in Richardson, Texas and has worked in assembly language and BASIC for four years. His game Rockslide, *appeared in the May, 1986 issue of* ***Antic***.

Listing on page 114 

ATARI PRINTERS
continued from page 51

document created with a simple BASIC program that read a text file character by character and copied it to another file (substituting periods for special characters). Then we had DOS 2.5 copy the file from the disk to each printer in turn.

Printer	Time	Characters Per Second (cps)
Epson FX-85	3:06	108
Star SG-10	3:45	89
Star NL-10	3:45	89
Atari SMM804	5:28	61
Atari XMM801	6:32	51
GP-550AT	9:41	34

(60 words per minute is about 5 cps.)

The speed differences in our ST graphics tests were even more dramatic. The Epson printed the Bee in two minutes, 28 seconds and the SMM801 took five minutes, 30 seconds (2.2 times as long). But the GEM desktop, which the Epson zipped through in 42 seconds, took the Atari four minutes, 55 seconds—seven times as long.

Also, both Atari printers are fairly loud. On a scale of 1-to-10, with 10 the loudest, the XMM801 and SMM804 would be closer to the GP-550AT (about 9) than to the Star SG-10 (about 2).

You'll get quality printouts from Atari's two new 9-pin dot-matrix units. The $219.95 suggested retail price is their most attractive feature. You won't get all the features, speed, quietness and software compatibility that you'll find in the market leaders, but you'll definitely get your money's worth.

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CIRCLE 250 ON READER SERVICE CARD

BY DAVID PLOTKIN, ANTIC CONTRIBUTING EDITOR

New Owners Column

Lesson 9: Subscripted Variables

This series, which started in the March, 1986 ***Antic****, teaches beginners how to program in BASIC on all Atari 8-bit computers such as the 800XL and the 130XE. Contributing Editor David Plotkin is a chemical engineer and longtime Atari programmer.*

Subscripted variables are very useful for storing and manipulating information. As you gain more programming experience, you'll learn that sometimes it can be limiting to hold values in standard variables (as explained in **Antic**, May 1986, page 107). Each variable must have a unique name, which must be kept track of. Also, Atari BASIC limits you to 128 different variables. Normally this is enough, but it's possible to run out.

An example of this might be a starship simulation program. Imagine that your universe is broken up into 120 sectors, 10 across and 12 down. Keeping track of all 120 sectors, each with a different variable name, would be cumbersome. Such situations cry out for subscripted variables, which make your job much easier.

Subscripted variables can hold a whole series of values at the same time because of their subscripts, which provide an index to each value. Each **element** of the subscripted variable has a different subscript and can hold a different value. An example of a subscripted variable is: EXAMPLE(2)=3.5, where EXAMPLE is the name of the variable, 2 is the subscript, and the value 3.5 is the second element of EXAMPLE.

Subscripted variables are given names just like regular variables. However, they are different from regular variables in two important ways. First, you must tell your Atari how much room to save for the values in each set of subscripted variables. This is done with the **DIM** statement.

PLACING VALUES IN STANDARD VARIABLES IS LIMITED. SUBSCRIPTS PICK UP THE SLACK

Second, values stored in the subscripted variable are accessed by use of the appropriate subscript.

A SUBSCRIPT CAN HOLD OVER 5,000 VALUES— A STANDARD VARIABLE, ONLY ONE

DIM STATEMENT

After you decide on a name for a subscripted variable, you must allocate memory to hold its values. The DIM statement DIMensions the subscripted variable. For example, if the variable UNIVERSE is to hold 100 values, then you would use the following:

```
10 DIM UNIVERSE(100)
```

You can DIMension more than one subscripted variable on each line:

```
10 DIM UNIVERSE(100),STAR(50),HIT(10)
```

Subscripted variables may also have two subscripts, in which case the DIM statement might look like this:

```
20 DIM DOUBLE(20,20),DOUBLE2(10,20)
```

Note that you can DIM more than one doubly-subscripted variable on a line, just as with singly-subscripted variables. You may also DIM both singly-subscripted and doubly-subscripted variables in the same DIM statement. You may *not* use variables with more than two subscripts. And it is important to know that DIMensioning a subscripted variable more than once in a program generates an error.

SINGLE SUBSCRIPTS

Singly-subscripted variables have one subscript that must be an integer, and each element can hold a different value:

```
10 DIM EXAMPLE(10)
20 FOR J=0 TO 10:EXAMPLE(J)=J*2.2
30 PRINT "EXAMPLE(";J;")=";EXAMPLE(J)
40 NEXT J
```

Thus, the subscripted variable EXAMPLE can hold 11 different values, one for each value of the integer subscript which was DIMensioned to 10. Although the subscript must be an integer, the value held by EXAMPLE(J) can be any number, including a calculated number. You can also simply assign a value to a subscripted variable:

```
50 EXAMPLE(0)=100.345
```

Another oddity about subscripted variables is that the subscripts start from *zero*. Thus, for example, when you DIMension a variable subscript for 10, you will actually have space for 11 values.

Singly-subscripted variables have many uses. This month's program Listing 1 demonstrates how they can be used to record test scores for a full classroom of students. Subscripted variables are quite commonly used with READ/DATA statements. Notice that you *cannot* READ the value contained in the DATA statement directly into the subscripted variable. The following will *not* work:

```
10 READ SCORE(J)
```

Instead, you must READ the value into a regular variable, then transfer it into the subscripted variable:

```
10 DIM SCORE(1)
20 READ SCORE:SCORE(0)=SCORE
```

The above is perfectly valid, because your Atari sees SCORE and the subscripted variable SCORE(J) as two *different* variables: The same principle applies when you use INPUT and GET to obtain a value for a subscripted variable—you must INPUT or GET a regular variable, then equate the subscripted variable to the regular variable:

```
10 DIM SCORE(1)
20 PRINT "What Score";:INPUT SCORE
30 SCORE(0)=SCORE
```

DOUBLE-SUBSCRIPT ARRAYS

Each subscript of a doubly-subscripted variable must be DIMensioned:

```
10 DIM UNIVERSE(10,12)
```

Doubly-subscripted variables are often thought of as being represented by rows and columns. Thus, UNIVERSE would have 10 rows and 12 columns, holding 10×12, or 120 values. Because of the analogy to rows and columns, doubly-subscripted variables are often referred to as **arrays**. To access the values held in an array, you must specify *both* subscripts:

```
10 DIM UNIVERSE(5,6):UNIVERSE(1,4)=2.1
20 PRINT UNIVERSE(1,4)
```

Again, the subscripts must be integers. The same rules for singly-subscripted variables apply to arrays.

As you can see, it is now quite easy to solve the problem of keeping track of 120 sectors in your starship simulation. Just DIMension a 10×12 array and store a number into each element of the array. This month's Listing 2 is an example of how you might carry this out. Notice how the nested FOR/NEXT loops are used to access each element of the array UNIVERSE by stepping through the subscripts. Using the RND (random number) function assures that there will be a different number of enemy ships in the sectors each time we play the simulation.

CALCULATED SUBSCRIPTS

I have stated that the subscripts must be integers. In fact, if you do specify a subscript which is not an integer, your Atari will round it to the nearest integer anyway.

You can also calculate a particular subscript by using the mathematical rules explained in **Antic's** July, 1986 New Owners Column. This option gives you considerable flexibility. For example, while you are limited to having two subscripts in an array, you can represent three-dimensional space with a singly-subscripted variable by doing some calculations on the chosen 3-D coordinates:

```
10 DIM SPACE(1000)
20 FOR J=0 TO 999:SPACE(J)=RND(0):REM PUT SOME
VALUES IN SPACE
```

continued on next page

30 PRINT "INPUT X,Y,Z COORDINATES (0-9)":INPUT X,Y,Z
40 IF (X<0 OR X>9 OR Y<0 OR Y>9 OR Z<0 OR Z>9) THEN PRINT "COORDINATE OUT OF RANGE!": GOTO 30
50 PRINT "VALUE IS ";SPACE(X+Y*10+Z*100):REM CALC. THE SUBSCRIPT.
60 GOTO 30:REM AROUND AGAIN

Both singly-subscripted and doubly-subscripted variables can be used like regular variables in mathematical equations and in GOTO/GOSUB statements. In fact, subscripted variables can be used just about anywhere that regular variables are used—except, as stated above, in READ, INPUT, and GET statements.

FRACTAL LISTING

Listing 3 makes extensive use of arrays to store values for later use. The program generates a shape on your screen which looks like a different 3-D landscape every time. The program uses a form of fractal arithmetic, which generates shapes that imitate nature. Memory requirements for Listing 3 are 32K disk and 24K cassette.

When the program starts, it will ask you how many levels you want. The higher the number of levels, the finer the resolution of the picture and the more lifelike the result. But the higher-numbered levels also take longer to draw on the screen. Level 6, the highest resolution, takes several hours, so be sure you want your computer tied up that long. Listing on page 112

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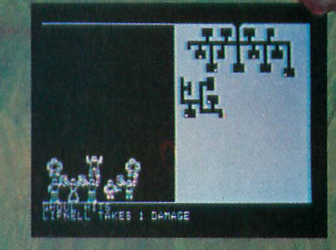
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A sample composition of your party showing race, class and status.

CIRCLE 085 ON READER SERVICE CARD

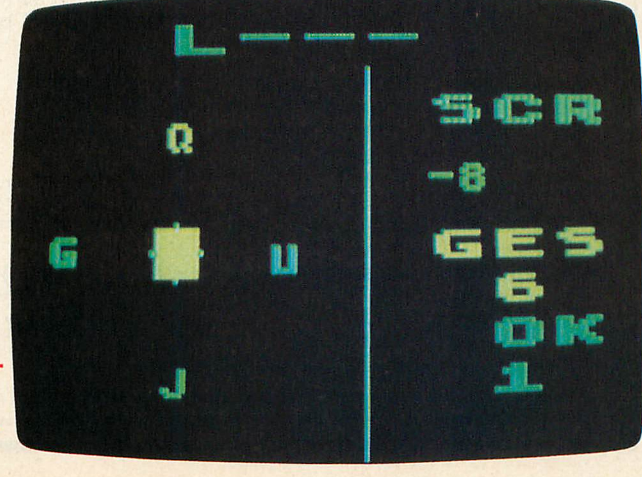
BY MATTHEW RATCLIFF

Spellblast

Space-action spelling action

Spellblast combines rapid-fire arcade action with the time-honored Hangman format to bring children a fun way to to learn spelling. The BASIC program works on all 8-bit Atari computers with a minimum of 24K memory, with disk or cassette.

Many children automatically seem to dislike things that are supposed to be good for them. Well, just leave out the word "educational" when you introduce your children to Spellblast, a space-action version of Hangman. The kids will soon be spelling better than ever, and they'll be having too much fun to realize that Spellblast is supposed to be "good for them."



In this fast-action spelling game, zap the correct letter before it reaches the starbase at the bottom of your screen.

The game can also be easily customized to help children—and adults—practice spelling the exact words they need more work on.

PLAYING SPELLBLAST

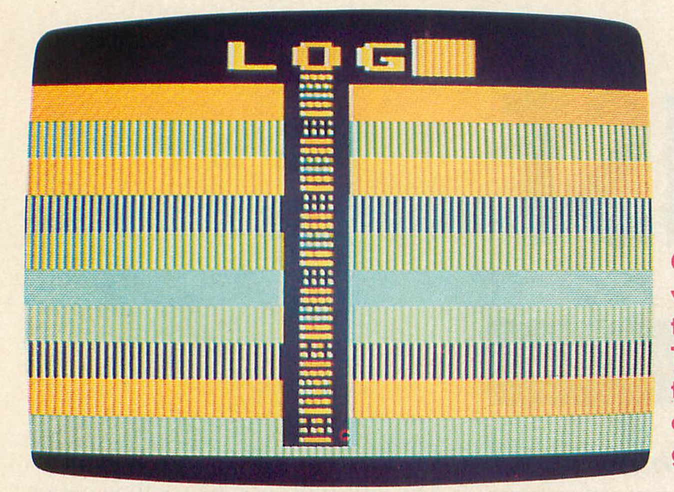
After the title page is displayed, pressing the joystick button calls up the instruction screen. Press the joystick button a second time to arrive at the topics menu. Move the joystick left and right to choose the total words to be spelled per game. The default value is 10, with a maximum of 50. Move the stick up and down to pick one of the desired topics from the display. Press the joystick button to begin game play. This published listing has three topics for spelling practice:

1. Animals, Fish & Fowl
2. Musical Instruments
3. Computer Terminology

A series of blanks for letters appears across the top of the screen. On the right is a display of the current score (SCR), total guesses for a given word (GES) and the number of correctly chosen letters in the word (OK). On the left is the play area, where your "spellbase" appears in the center of a wave of attacking letters.

Four letters approach your base from above, below, left and right. At least one of these letters *might* fill a blank. Just point the joystick handle

continued on next page



Guess the whole word by pressing the [SPACEBAR]. Typing a correct letter zooms it into the correct space and gives you 10 points.

toward your guess—don't press the trigger button. If you guessed right, the letter you blasted will fill each blank where it belongs in the word. Each correct letter scores two points, but a wrong guess deducts two points. If you think that none of the four letters in a turn are correct, press the joystick button to pass without a wrong-guess penalty. Holding down the joystick button also lets you pause the action and think a bit, before the next quartet of letters descends upon you.

As soon as you think you know the whole word, press the [SPACE BAR]. A large flashing cursor appears at the first blank space remaining in the word. Typing a correct letter zaps it into the blank and adds 10 points to your score. An incorrect guess sends you back to the play screen with a new wave of letters.

Correct completion of a word gives you a 10-point bonus. If you allow a wave of letters to reach your spellbase and destroy it, you lose 10 times the number of points earned in the current word—after which the correct spelling is shown. After you spell all the words for the game, the total, high score and best guess ratio are displayed. Press [Q] whenever you want to quit.

TYPING IT IN

Type in Listing 1, SPELLB.BAS, check it with TYPO II and SAVE a copy before you RUN it.

If you have trouble typing the special characters in lines 5000-5068, don't bother typing them in. Listing 2 will create these lines for you and write them to cassette, or to a disk file called SLINE.LST. Now type NEW and LOAD Listing 1, then ENTER the file created by Listing 2. Make sure you SAVE a copy of the combined program before you RUN it.

CUSTOMIZING SPELLBLAST

Adding new topics or words to Spellblast is easy. First, change the value of TOPICS in line 2820. Next, add an appropriate menu bar to the number of topics available. Follow the example menu in lines 2850-2870, when adding a new menu line. For example, suppose we are going to add European Countries. TOPICS would then have to equal four in line 2820. We would then add a line to the menu as follows:

2880 POSITION 6,8:?
"4. EUROPEAN COUNTRIES"

Once these steps are complete, just add DATA to the program. There must be five words per line, but if you're a few words short, just repeat some of those already listed in the topic. The beginning line number and the total number of lines in the new topic,

must also be added following the data in line 20000. In our example, you could add line 20010 as follows:

20010 DATA 10040,5

You would then be able to select from four topics for the game.

You are limited only by the size of the screen for topics, which will allow 17 with the current display layout. The words are limited in length to 10 characters. Any more than this causes wrap-around and confuses the display (but does not crash the program).

Memory limitations can be remedied by keeping each topic in separate text files on disk or cassette. Spellblast could then be modified to ENTER new DATA lines in place of the old ones, along with a new set of topics.

PROGRAM TAKE-APART

200-290: Select a wave of four letters for the game-play loop.

300-595: Draw a wave of characters, get joystick input and set flags.

600-650: Clear the game-play area of the screen.

1000-1430: Display the game title screen.

1500-1610: Select a new word at random from the current topic.

1620-1740: Letters-hit-spellbase routine. Deduct points and continue with a new word.

1750-2020: Spell out the word from keyboard input.

2030-2230: Process selected letter from joystick input and see if word is complete.

2300-2780: End-of-game routine. Print out totals and wait for keypress.

10000-10037: Word DATA for three topics (exactly five words per line.)

20000: DATA indicating beginning line number and total lines of word DATA under each topic.

In May, 1986 Matthew Ratcliff of St. Louis, Missouri won the Antic Award for Outstanding Contributor to this magazine. Listing on page 107

BY SCOTT KILBOURNE, JON HOLCOMB AND WILLIAM HALL

Stepper Motor Robot-Controller

Moving real things with your Atari



Have you ever wanted to use your Atari to move things? Perhaps to roll a robot around, direct a photocell scanner from across a room, or move a manipulator arm? Stepper motors can do it—with the interface board and software described in this article. Note: To complete this project successfully, you must be enough of an electronics hobbyist to read schematic diagrams and solder a circuit board. The BASIC program works on all 8-bit Atari computers of any memory size, with disk or cassette.

Stepper motors move the print head and the paper feed on dot matrix printers. They move the head assembly on your disk drive in and out with great precision, accessing different disk tracks. In fact, steppers are very versatile and would be used for even more purposes except that you can't just connect them to a power source and switch them on and off. They must be controlled with sophisticated hardware—such as your Atari computer.

*(**Antic** successfully tested the stepper motor interface board and software provided by the authors. But because we wanted to get this important (and thoroughly detailed) material into print as quickly as possible, we did not take time to rebuild the hookup from scratch, as is our usual procedure when publishing hardware-software projects.*—ANTIC ED)

HOW STEPPERS WORK

Stepper motors rotate only a little bit when pulsed, typically 1.8 to 3.75 degrees. But they do it with precise accuracy and powerful torque. These motors move something into position and lock it there firmly. Unlike most other tools for moving things, stepper motors can tell you exactly how far and how fast they have moved, and which way they are pointing.

All electric motors have two basic parts—the armature, which turns, and the stator, which doesn't. Magnetism pushes and pulls the armature with the stator. In a conventional motor, when the armature almost gets to where magnetism is moving it, brushes contact new areas and the magnetic polarity is switched. The armature suddenly has a long way to go again—rather like coaxing a horse forward with a carrot on a stick.

Most conventional motors have only one stator coil, but stepper motors usually have four. Steppers also use a permanent armature magnet instead of armature coils, commutators and brushes. Stepper motors let the armature catch the carrot, and they magnetically lock the armature into each position. Turning on another coil of the stator and turning off the previous coil moves the armature another step and locks it into a new position.

The stepper motor controller rapidly distributes precisely timed bursts of electricity to the different coils of the stepper motor and provides the timing to control the speed. It can also count the number of steps traveled—that is, how far the armature has been turned—with computer-like accuracy. And this is where your Atari comes in. The software and hardware explained in this article will let you use your Atari as a stepper motor controller for many robotics-type projects of your own choosing.

HOOKING UP

An Atari 8-bit computer has excellent Input/Output capabilities that include two joystick ports, each containing four digital I/O pins, two analog (paddle) inputs, a trigger input, a five-volt direct-current source (+5VDC) and a ground. These items meet the needs of most stepper motors. The digital I/O lines can be used in a joystick port to turn the stepper motor coils on and off, while the +5VDC and ground can power the interface circuit. The source of the current to power the motor depends on the stepper motor used.

In our sample interface, we'll use an Airpax 86402, a +12VDC four-phase stepper. This is a good choice because +12V is easy to get and the motor is strong and precise—only 1.8 degrees per step—but mostly because it's cheap. In fact, we can buy the whole controller and motor with power supply for less than $25. Steppers are usually fairly expensive, but if you buy from surplus stores the prices get ridiculously low ($3.95 for the one we used).

To turn the stepper motor, we apply +12V to different phases (combinations) of stator coils in turn. The stepper can be turned in half steps by using another set of combinations. But the half steps don't have the same powerful torque as the full steps and your project will probably not need to use them.

Some stepper motors need different arrangements for coils and phases. These can be obtained from the stepper manufacturer. *Figure 1* shows which coils to send power to for different amounts of clockwise and counter-clockwise rotation, on an Airpax and similar motors.

We will assign one digital I/O pin in the joystick port to each coil, and use that pin to turn the power on and off for that coil. The Atari software will regulate the combination of coils to power during each phase, take care of the timing and keep track of the stepper position.

We must build a circuit to tell the coils when the joystick lines go high or low. We'll use a 2N3055 transistor to turn the power on and off. A 7404 integrated circuit will turn the transistor on and off with the digital line, and costs as little as 15 cents. A diode keeps the motor noise out of the computer, a pull-down resistor keeps false signals away and a power resistor cools the motor.

HIGH-LOW

When the joystick line for a coil goes low, the 7404 sends +5V to the base of the transistor, turning that transistor on and allowing the current from the motor to flow through the transistor to ground, powering that coil. The current goes through a power resistor before reaching ground, however, limiting total current flow.

continued on next page

CW Rotation ↓ / CCW Rotation ↑

Step #	Q1	Q2	Q3	Q4
1	ON	OFF	ON	OFF
1½	ON	OFF	OFF	OFF
2	ON	OFF	OFF	ON
2½	OFF	OFF	OFF	ON
3	OFF	ON	OFF	ON
3½	OFF	ON	OFF	OFF
4	OFF	ON	ON	OFF
4½	OFF	OFF	ON	OFF
1	ON	OFF	ON	OFF

Figure 1

SOME SUPPLIERS

Below are three electronics sources where the authors found good deals on key parts for this project. This short list is clearly not meant to be a complete guide to all possible parts suppliers throughout the U.S.

John J. Meshna Jr., Inc.
19 Allerton St.
Lynn, MA 01904
(617) 595-2275
Stepper Motor SP-369B31 $3.50

Jerryco
601 Linden Place
Evanston, IL 60202
(312) 475-8440
11.5VDC Power Supply J-3895 $7.50

H & M Engineering
1945 S. Lincoln St.
Springfield, IL 62704
(217) 787-8422 (after 5 p.m.)
Stepper Motor
Printed Circuit Board $8.50

When the joystick line goes high, the 7404 output and the transistor are turned off, stopping the current flow in that coil. We invert the pin/power relationship because the Atari normally puts all four pins high after a system reset. That would simultaneously power all four phases of the stepper before the program takes over and heat up the motor unnecessarily.

A diode between the 7404 and the transistor allows current to flow from the chip to the transistor, but not vice versa. This prevents motor noise from backing up through the system. The pull-down resistor keeps the transistor off until the computer supplies a signal. This is repeated once for each coil. The 7404 handles all four digital signals, triggers each transistor, and is powered and grounded by the joystick port.

The power and ground for the stepper motor come from a +12VDC power supply. A power supply from an Atari 5200 video cartridge system is rated at +11.5 VDC, which is close enough. There are ample 5200 power supplies on the surplus market for $7-$8 each.

Assembly of the interface board is comparatively easy, but beginning hardware hobbyists should work carefully and use a low-wattage soldering iron. Follow the schematic diagram in *Figure 2* if you are using perforated board, which works fine if you don't want to etch your own board. Or work from *Figure 3* if you are making a printed circuit. Use a socket for the 7404, make sure your solder joints are good and don't short the IC's pins together. Watch out for correct wire connections to the 2N3055.

If you are using the Airpax 86402 stepper motor, connect the two red wires to the positive lead of the power supply. The other four wires are the individual phase wires and should be connected to the board as follows:

Yellow Q1
Orange Q2
Brown Q3
Black Q4

The stepper motor plugs into the interface board via a polarized connector. Plug the power supply to the board, following the correct polarity. Plug the DB-9 socket into the first joystic port, plug in the power supply and RUN the software.

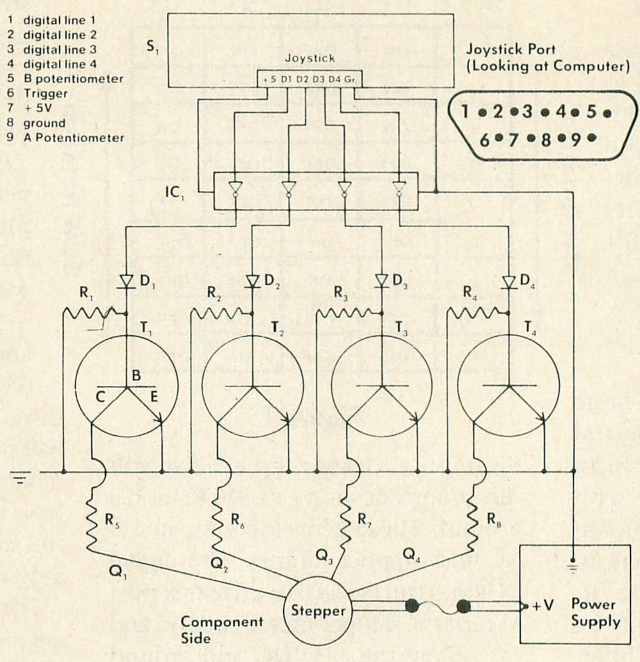


Figure 2

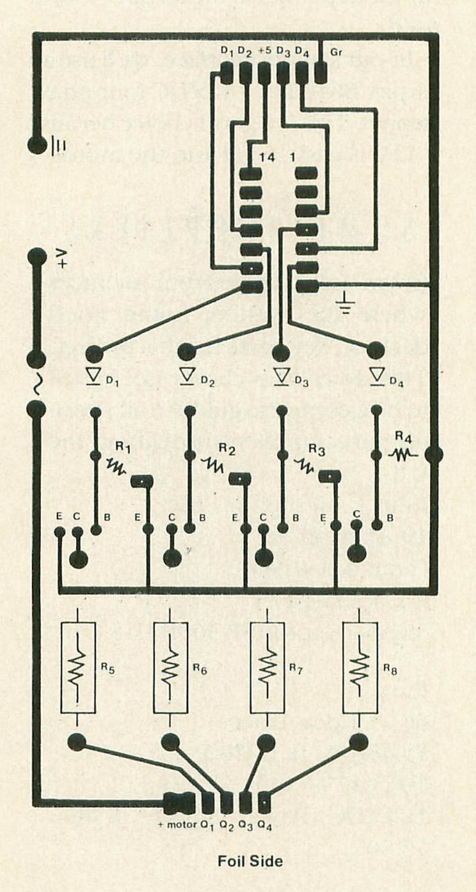


Figure 3

Our stepper program was written to control various different motors. And different brands of stepper motor have different maximum stepping speeds. When performing a full-speed movement, the program may sequence the steps a little too quickly for your particular model of stepper motor, which would cause erratic movement. If necessary, insert a FOR/NEXT delay loop between steps, to smooth out the motion.

THE PROGRAM

Type in Listing 1, STEPPER.BAS, check it with TYPO II and SAVE a copy before you RUN it.

This program was originally written to raise and lower a camera platform in precise increments. (See adjoining story, *Steppers In Microphotography*). But the modifications to move almost anything else are simple. The program includes routines for quickly moving the motor in either direction, moving it to a given point, keeping track of the stage position, adjusting speeds, signalling when a move is complete and moving from point to point.

Each time a phase is powered, some I/O pins must be turned on and some off. This corresponds to putting ones and zeros into PORTA (location 54018, $D300). PORTA is the memory location of joystick port 1 when it is being used as a data register. POKE that location with the decimal equivalent of the proper binary number (5 for 0101, 9 for 1001, etc.) to push the four joystick pins high or low. Labeling each phase number with a variable makes it clearer. Then we just POKE PORTA,A:POKE PORTA,B: POKE PORTA,C etc., to turn the motor.

By noting how many times we've POKEd the stepper, we can record its

motion and then turn it to selected positions with precision. Inserting a FOR/NEXT timing loop creates a variable delay to control the speed. POKE PORTA with A,B,C,D,A,B etc. in order, to turn the motor turns in one direction. If you POKE in the reverse order, it turns in the opposite direction. POKE PORTA with A,E,B,F,C,G, D,H,A,E,B etc. to turn it in half steps.

PROGRAM TAKE-APART

The program's REM statements explain various sections. Line 310 sets up joystick port 1 for output. Memory location 54016 ($D302) is the PORTA control register (PACTL), and these POKEs set up PORTA for output to the joystick port.

I should mention a few other programming tricks used in the display routines. One trick is to DIMension BL$ in line 270 and PRINT it in line 490 (every time the menu is rewritten). BL$ is a character string filled with blanks, and here it clears the command line.

Second, although the menu and commands are in Graphics 1, the display settings are in Graphics 0. Lines 110-120 print the display and the initial settings. Note that PRINT #6; prints to the Graphics 1 screen, while PRINT is used to print in the text window.

The statistics are updated by POKEs to TXTROW and TXTCOL (memory locations 656 and 657) throughout the program. These locations hold the row and column, respectively, for the current cursor location in the text window. In line 890, for example, each time the program moves the stage and updates P (the present location variable), the cursor goes to row 2, column 28 where P is PRINTed. You must also PRINT a trailing space to clear the old number.

Finally, the ticking noise in the keyboard speaker as the program moves the stage up and down is produced by POKEs to CONSOL, memory location 53279 ($D01F). This is the same location used for reading the console keys. By using FOR/NEXT loops and experimentation, you can create a "fifth voice" for your Atari.

Using stepper motors with your Atari can open a world of computer-controlled precision movement. You can control a robot on wheels powered by stepper motors, using arms controlled by stepper motors, seeing with a scanner positioned by a stepper motor. And who knows what else?

In my own case, I've found that making the robot open the refrigerator door is easy, but how do I get it to take the tops off the bottles?

INTERFACE PARTS LIST

Label	Quan.	Description	Radio Shack #	Price
T1-T4	4	TIP 3055 transistor	276-2020	$1.59
D1-D4	4	IN4001 diode	276-1101	$.49
R1-R4	4	1000 ohm 1/2watt	271-1321	$.39
R5-R8	4	50 ohm 2 watt resistor		
IC1	1	7404 integrated circuit	276-1802	$.99
		(with 14 pin socket)	276-1999	$.89
S1	1	DB9 socket	276-1538	$2.49
	1	perforated board	276-1394	$1.89

Plus wire, 1 amp fuse and holder, solder, case, printed circuit board if desired, etc.

Scott Kilbourne is the Chief of Medical Photography at Southern Illinois University and president of the Lincolnland Atari Users' Group. Jon Holcomb is a Radiation Safety Technician at the Southern Illinois Unversity School of Medicine. William Hall is Deputy Director of the Illinois Dept. of Children and Family Services. Bill Andrea provided some of the illustrations.

PROGRAM BY JOE BRZUSZEK
ARTICLE BY CHARLES JACKSON

Landscape Illusion

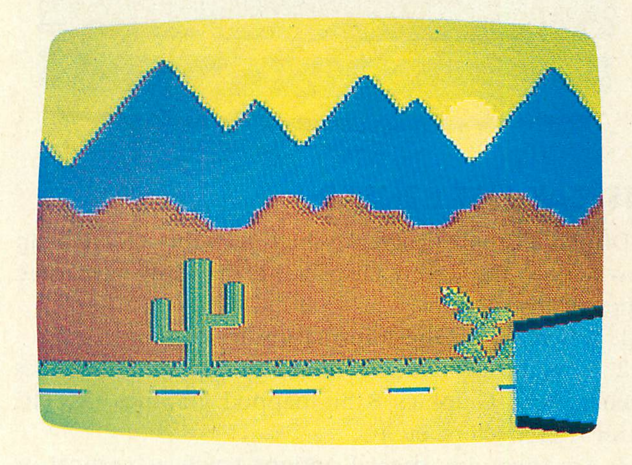
Take your Atari on a scrolling 3-D drive through the desert, complete with engine noises. The illusion of three-dimensional depth is surprisingly effective. This BASIC program works on all 8-bit Atari computers with at least 32K disk or 24K cassette.

This colorful optical illusion demonstrates parallax—the way objects appear to move when the viewer changes position. 3-D Landscape Illusion simulates driving through a desert where nearby objects seem to "move" faster than more distant objects. There are also engine sounds to help maintain the illusion.

Type in Listing 1, GOWEST.BAS, check it with TYPO II and SAVE a copy before you RUN it. If you have trouble typing the special characters in lines 210, 1010, 1030, 1100-1150, 1270-1280 and 1330-1350, don't bother typing them in. Listing 2 will create them for you and write them to a file called GWLINES.LST. Once you've created this file, type NEW and LOAD Listing 1. Next, ENTER the file created by Listing 2 to complete the program. Remember to SAVE a copy of the merged program before you RUN it.

When you RUN 3-D Landscape Illusion, it creates a desert scene divided into three independently scrolling horizontal strips. The mountains are drawn in the top strip, which moves slowest. The hills occupy the center strip, which scrolls a little faster than the mountains. The road is the bottom strip and scrolls fastest of all.

Landscape Illusion simulates motion by scrolling the foreground and background scenes at different rates.



The Sun and the car bumper are players and remain stationary. The Player/Missile priority selection register (GPRIOR, memory location 623) is set to 2, allowing the Sun to apparently "slip behind" the taller mountain peaks. This instruction is in line 170.

continued on next page

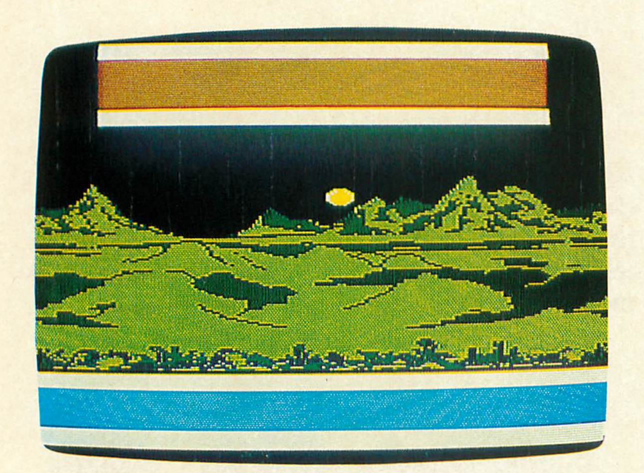
Scrolling scenery fools the eye

ANTIC MODE 4

The hills, mountains and the road are made of redefined characters, and displayed in ANTIC Mode 4 (Graphics 12 on XL and XE computers). This four-color character mode has the same horizontal resolution and twice the vertical resolution of Graphics 7—but requires less than a third as much memory.

Unlike other character modes, ANTIC Mode 4 characters were not meant to be formed into words and sentences. They're primarily used to generate detailed playfields which use a minimum of memory. To design original games or other graphics with your own ANTIC 4 characters, you need a special character set editor such as INSTEDIT ($15.95, The Catalog, AP0117).

Sub, a joystick-controlled illusion, simultaneously scrolls four horizontal scenery "strips."



DISPLAY LIST BENDER

A Display List is a program which tells the ANTIC chip how to draw the screen. Display lists may only have three types of instructions:

1. Where to get the information to display.
2. How the information should be displayed (Graphics 0 characters, Graphics 8 bit-mapped graphics, ANTIC Mode 4 characters, etc.)
3. Are there any special options (such as vertical or horizontal scrolling, or interrupts) to consider?

3-D Landscape Illusion constructs a special display list which extensively uses all three types of instructions. The Graphics 23 call in line 40 establishes a Graphics 7 display list, without a text window.

Routines in lines 120-140 change this display list into the special ANTIC 4 display list which handles all three scrolling strips, plus the background.

A display list interrupt (DLI) at the start of each strip controls its horizontal scrolling, and changes color values at the bottom of the screen. A Vertical Blank Interrupt (VBI) routine controls the DLI's timing, and handles coarse scrolling. These routines are called in lines 210 and 220.

DISK BONUS

This month, Antic Disk owners are treated to a second optical illusion. SUB.EXE is a machine language joystick-controlled scrolling demo for all 8-bit Atari computers. This smoothly detailed, unearthly landscape was programmed by Patrick Bass, Antic's ST Program Editor. To see SUB in action, choose Main Menu selection 1 to get into DOS and then [L]oad SUB.EXE from DOS Menu selection L.

The following books will teach you more about these advanced graphics techniques:

Atari Graphics and Arcade Game Design
By Jeffrey Stanton with Dan Pinal
477 pages
$19.95, Antic Catalog, MG0103

Your Atari Computer
By Lon Poole
Osborne/McGraw-Hill
465 pages
$17.95

Pennsylvanian Joe Brzuszek sent us this impressive graphics demo along with a letter explaining why he believes the 1/60th-second television screen refresh rate is not fast enough to meet the **Antic** Lightstick Challenge *(July 1986, page 29).*

Listing on page 105

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HOW TO WIN

We are looking for the most powerful, versatile, easy-to-operate programs that perform useful jobs in the real world. The more uses for your software, the better. For example, a stuffed-animal database for taxidermists would probably be considered too specialized by the magazine's judges—no matter how excellently it is programmed.

The winning software must be user-friendly, most likely menu-driven wherever possible. Users should not need programming knowledge in order to successfully operate the application programs.

Please note that some of the other popular Atari program categories—such as utility routines that add power when inserted into your own programs—cannot properly be considered applications. Practical application programs should be complete, stand-alone software that does an entire user-controlled job from start to finish. For example, a drawing or painting program would be a practical application—a colorful graphics demo would not!

TECHNICAL RULES

Programs must run on the Atari 800, 800XL and 65XE models and require no more than 48K memory. However, programs that *also* take advantage of the extra memory in the 130XE will be given preference.

Programs must be written in standard renumberable Atari BASIC or MAC/65 assembly language, under a disk operating system compatible with Atari DOS 2 or 2.5. Program listings cannot be larger than 150 sectors of a single-density disk.

Thorough error-trapping is very important. Your program should not crash every time a user accidentally presses the wrong key. And please do not include authors' copyright statements in your listing.

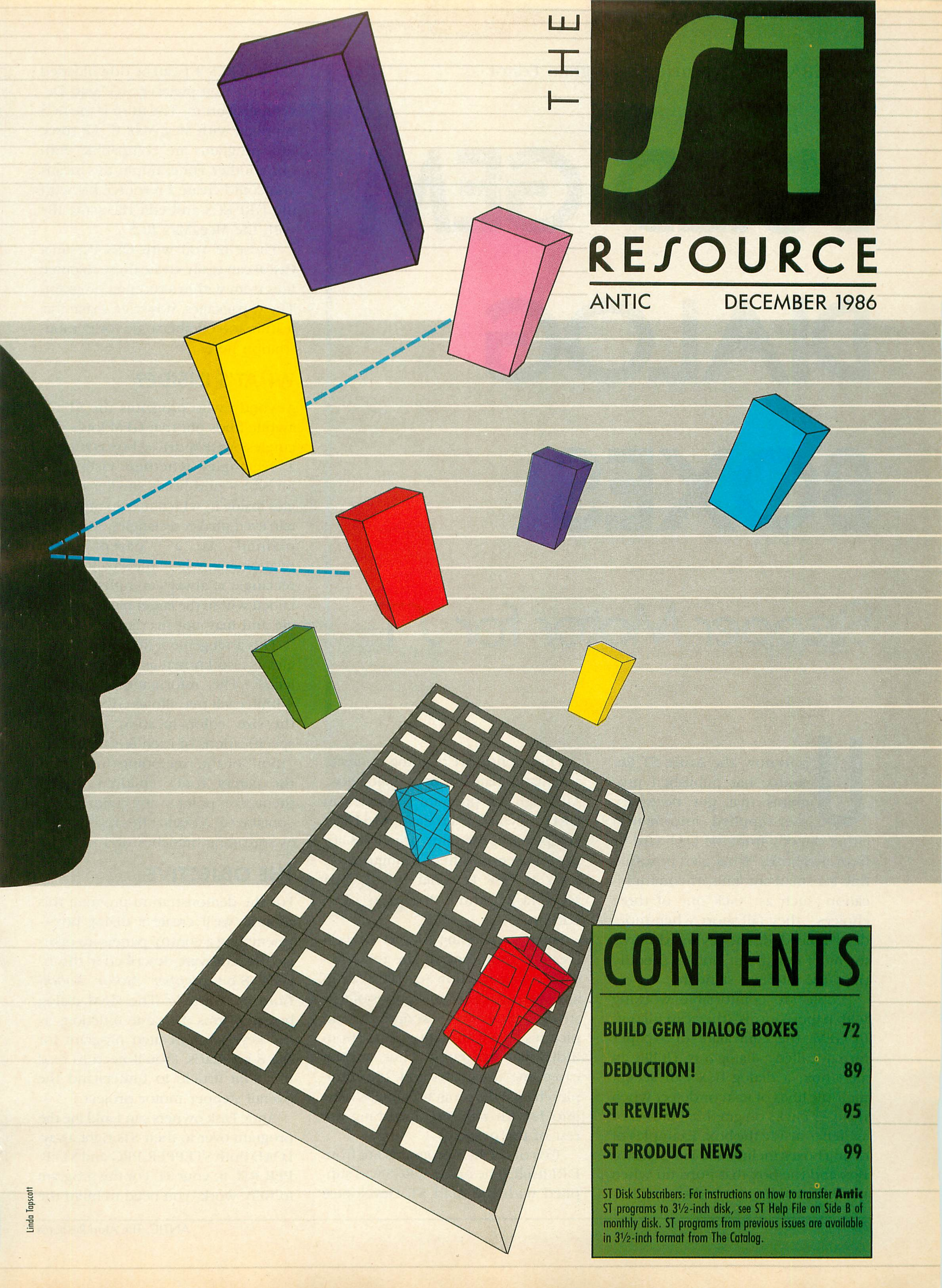
JUNE 15, 1987

All entries in the **Antic** 8-Bit Practical Applications Competition must be received by June 15, 1987. Winners will be announced in the November, 1987 issue of **Antic**. Judges' decisions are final.

Entries—programs and accompanying articles—should be submitted on disk *and* in printout. Entries will be returned only if the author provides a stamped, self-addressed envelope.

Send entries to:
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Antic Magazine
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San Francisco, CA 94107

All 8-bit practical application programs accepted for publication by **Antic** between November 1, 1986 and June 15, 1987 will also be automatically evaluated as potential prizewinners in the contest.



CONTENTS

ST Disk Subscribers: For instructions on how to transfer **Antic** ST programs to 3½-inch disk, see ST Help File on Side B of monthly disk. ST programs from previous issues are available in 3½-inch format from The Catalog.

by PATRICK BASS, **Antic** ST Program Editor

BUILD GEM DIALOG BOXES

Stepper Motor for ST

Up to now, the **Antic** ST Resource has published programs that got necessary user-supplied information either directly from the keyboard or from alert boxes. While alert boxes are fine for small amounts of communication, such as "pick one of three choices," they fall short when more detail is needed. The keyboard allows for more detail, but isn't as friendly the GEM interface standard.

People are comfortable working with paper "forms" they can fill out. In GEM, the equivalant of a paper form is called a dialog box. Unlike an alert box, a dialog box can accept multiple lines of text, or detect when the user clicks on graphic buttons or switches inside the box. Examples of dialog boxes include the File Selector Box and the box that pops up when you "show info" on a disk or file.

This month, we're going to create and manipulate our own dialog box. Although the program is written in DRI's Alcyon C from the Atari ST Developers Kit, the same principles apply for users of other ST languages—such as OSS Personal Pascal, TDI Modula-2 and Prospero Pro Fortran-77.

Since we're using Alcyon C, we'll create it using one of the three Resource Construction Sets (RCS) available. Resources are collections of text strings, rectangle descriptions and pictures which are kept separate from individual programs. Thus anyone can come along later and, for example, change the program's English text into French *without* disturbing the rest of the program.

Two of the RCS programs are from DRI itself. The original RCS was supplied with the Atari ST Developers Kit, and RCS 2.1 can be downloaded from the CompuServe SIG*Atari Developers Forum. The third is the RCS supplied with MegaMax C. All three RCS programs are compatible with one another. For example, this means you could create a resource file with the DRI RCS and edit the same file with the MegaMax RCS.

Those of you with OSS Personal Pascal can easily create these resource files from within a running program. The C packages, however, make this feature too cumbersome for demonstration here.

WHAT'S INSIDE?

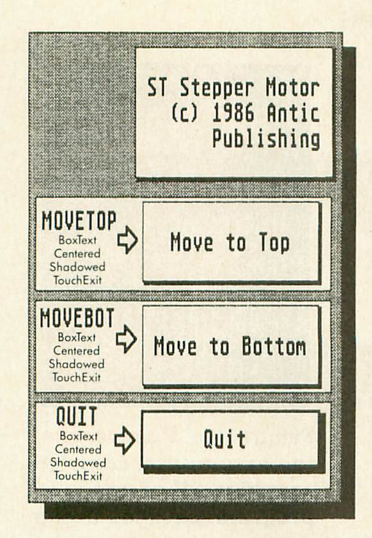
Anybody who programs the ST for awhile finds out that GEM loves rectangles. A GEM dialog box is *always* a rectangle—whether visible or invisible—and holds smaller rectangles inside it, which may in turn contain even smaller rectangles. This is explained as a "parent/child" relationship, where the smaller child rectangle is always completely contained within the larger parent rectangle and may not overlap.

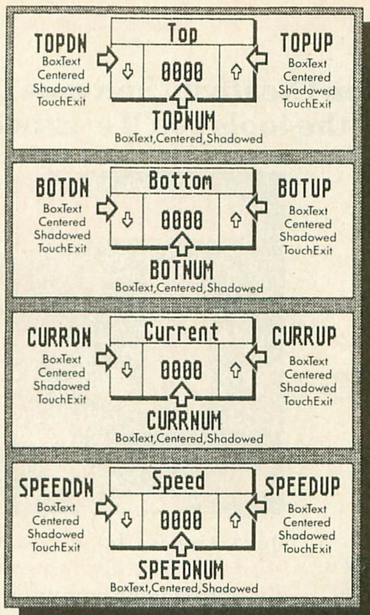
This arrangement of nested rectangles is also known as a "tree of objects". The information structure within each tree allows GEM to track the size, color, location and other specifications of each rectangle. The "root" of the tree points to each of the parent root's children, which themselves point to any children they contain, etc. Visualize this relationship as spreading branches of a tree.

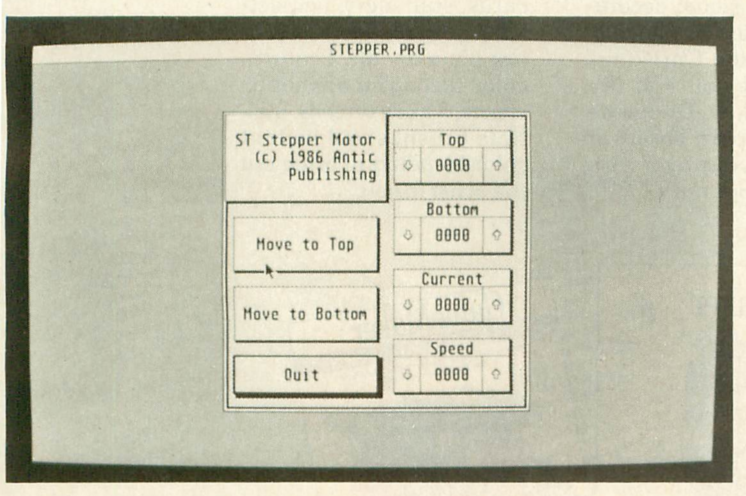
THE OBJECTIVE

For the demonstration program this month, we'll create a dialog box—resembling a control panel—to operate the hardware described in this issue's 8-bit *Stepper Motor Robot-Controller* article. The GEM dialog box performs the same functions as the keyboard-operated program for the 8-bit Ataris. (You'll need to read the 8-bit article to understand the overall stepper motor project.)

Antic Disk owners can LinkLine the program over to their STs right away. LOAD both STEPPER.PRG and STEPPER.RSC to your ST. For the program to fully work, you need to build the







Above: Diagram of ST Stepper Motor dialog box (drawn with DEGAS) showing the GEM names and attributes. Below: Completed onscreen dialog box.

interface board described in the 8-bit stepper motor story. However, if you just want to study the programming of ST dialog boxes, this program will run only if you have your printer connected and online.

If you don't have this month's Antic Disk, carefully type in Listing 1 STEPPER.C, and SAVE a copy to disk. Compile and assemble this C source code down into a **.o** file, and then link it to **apstart**, with **aesbind**, **vdibind**, **osbind**, and **libf** trailing along behind. **Relmod** the resulting **.68K** file into a **.prg** file and you're half finished. We now need to create our resource file.

BUILDING A RESOURCE

Figure 1 is a picture (drawn with DEGAS) of the dialog box created for the ST Stepper Motor program. Using your Resource Construction Set to reproduce the rectangle sizes exactly as shown is not important. The important thing is that you correctly *name* each of the objects and correctly set their individual *attributes*. For example, let's look closely at the four objects at the upper right of the dialog box—these objects combine to form a controller for the way we change and monitor the top location of the camera platform.

There are three smaller boxes below a full-width box that contains the word "Top" inside it. Of the lower three boxes, the center one has a four-digit number in it and the two flanking boxes contain a down and an up arrow. All four object boxes are of type **BoxText**, and are **shadowed** and **centered**. The two arrow objects are also **touchexits**. The main difference between them is their *names*.

The "Top" box has no name, because it's only there as a title. The up arrow box is named **TOPUP**, the down arrow is named **TOPDN** and the number is named **TOPNUM**. Each object has its own unique number, so we can use these names just like declared constants when we later need to determine which object we are dealing with. When you're finished creating your new resource, save it to disk. The Resource Construction Set will automatically create a .h header file for inclusion with your C program, containing all the names for the parents and children, along with their object numbers.

For example, because the up arrow object is a **touchexit**, when the program runs and we interact with the dialog box we will receive the number of the up arrow object—TOPUP—whenever the user presses the left mouse button while pointing at that object. We can test for the number of the object which caused the exit from the dialog box and act accordingly. In this case, getting the object number TOPUP from the dialog box directs us to increment the TOP number by one.

SAVING A RESOURCE

Finish creating your new dialog box using your RCS and the example in *Figure 1*. Save it to disk using the name STEPPER. When you examine the directory for that disk, you'll find the RCS has created at least three files:

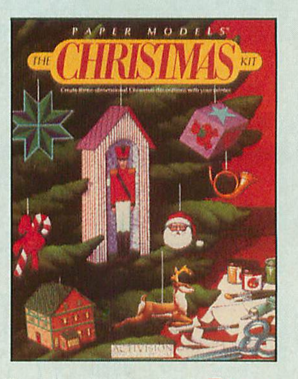
1. **.RSC** file—the resource itself.
2. **.H** file—contains the names and object numbers. This file is for C programs only, but the RCS from Digital Research can also create files compatible with Pascal or Fortran-77.
3. **.DEF** file—tracks how different trees in a single resource are classified. Categories are dialog boxes, menus, free strings, or unknown. This file is only needed when you reopen a resource file for editing. You can edit a resource *without* the **.DEF** file, but you must reclassify all trees inside the resource file itself. Incidentally, RCS 2.1 creates a **.DFN** file, which works the same way.

When the resource is created, you can run STEPPER.PRG by just double-clicking on its icon. The program will

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CIRCLE 083 ON READER SERVICE CARD

search for, and load, the STEPPER.RSC file, presenting it for interaction. Let's examine the program in detail.

PROGRAM TAKE-APART

This program is written in the original Alcyon C contained in the Developers kit. It is *not* the new Version 4.14. We'll switch when we learn that enough readers have access to Version 4.14. Those of you with MegaMax C should find little problem in converting this program—basically just substitute **sprintf()** for the published program's **ftoa()**. Lattice C and Mark Williams C owners are also encouraged to try.

The top few lines contain remarks for the title and version date. Right below, we **#include** the **stepper.h** file constructed by the RCS and the stock **osbind.h** that everybody knows and loves.

Next come **#defines**, where we redefine some funny C operators into understandable words. The last three lines construct LWGET(x), which functions like an inline PEEK statement for words, and OB_W / OB_H, which will allow us to get the width and height of object rectangles when we update them.

Below the **#defines** are definitions for OBJECT and TEDINFO structures. Structures are a convention in C to relate different sizes of data into an easily accessed form. They are similar to Pascal RECORDS.

Below the structure definitions come the global variable declarations including the 16-bit **ints**, the 8-bit **chars**, and the 32-bit **longs**.

Now we start our program logic. In **main()**, which every C program *must* have, we describe the program's operation briefly. Here, we **initialize()** the application, then **move_the_stepper_motor()**, and **repeat** this action **while(not finished);**. When we finally get **finished**—when **finished** sets TRUE—we'll **terminate()** this application and return to the desktop.

INITIALIZATION

Initialization here hooks our program into GEM and gets our application "handle." Then it opens a virtual workstation that returns a world of information about the type of terminal we're on, in the array **workout[]**.

The first of two new calls, **rsrc_load()**, when given the path/filename of the needed resource file, will determine how big the resource is, reserve enough memory, and then load the resource into the just-reserved memory section. The second call, **rsrc_gaddr()**, will return the long address of the memory location holding the root of the desired tree.

From here we can search the tree for any desired object within. Before we leave the initialization function, we set **a, b, c,** and **d** — which match the function and value of a, b, c, and d in the 8-bit Atari program—to their proper port bit-pattern values. Then we force the mouse pointer sprite back to a pointing arrow, and set **finished** to FALSE, because we haven't finished the program yet.

MOVING THE MOTOR

In **move_the_stepper_motor()**, we have the major block of code for interacting with our dialog box. The forms library call: **form_center()** will figure out the screen position to center the dialog box (based on the size of the dialog) and return them to the variables **xdial, ydial, wdial,** and **hdial**. The next call, **find_box_sizes()**, computes the clipping rectangle needed for each numeric display inside our dialog.

form_dial(0...) saves for later redrawing a copy of the screen portion covered up by the dialog box. **form_dial(1...)** draws the "growing box" display from size **x, y, w, h** to size **xdial, ydial, wdial, hdial**.

We draw our dialog box on the screen with the **objc_draw()** call, which needs to be told the location of the ROOT of the tree to be drawn (box_address), which object to draw (TREE1), how many children deep to draw (2), and the largest clipping rectangle expected, (x, y, w, and hdial).

We now begin interaction with the displayed dialog. The **form_do()** call needs the ROOT of the tree to interact with, and the number of the editable text field (TEDINFO) on which to place the cursor when the

continued on page 87

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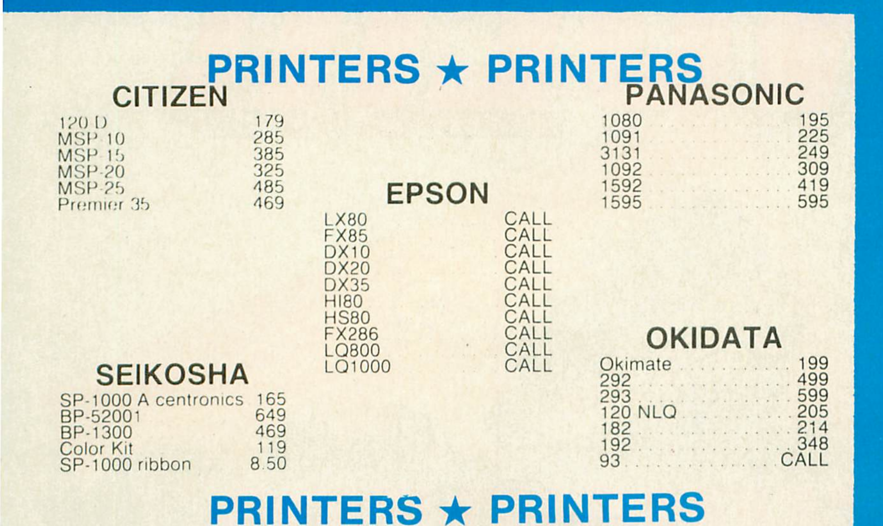
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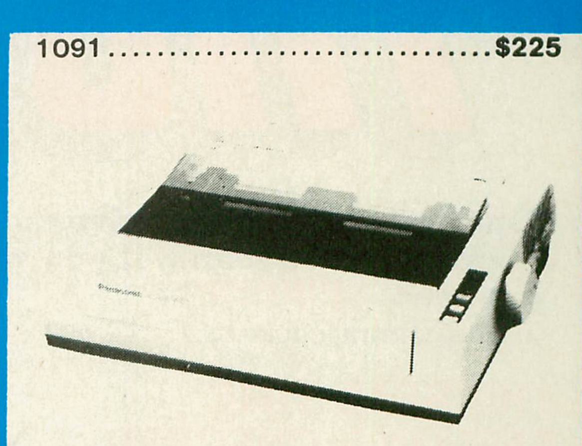
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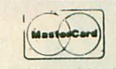
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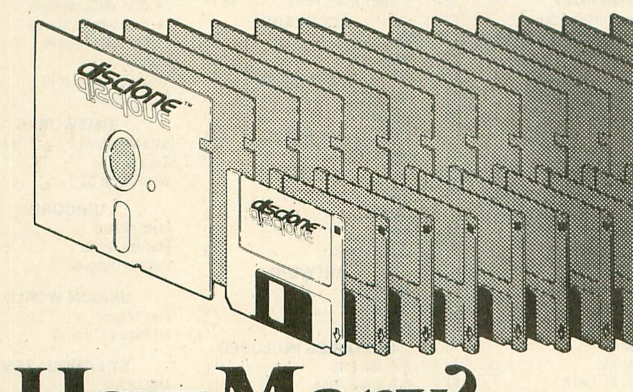
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- The Pawn 29

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  - Accounts Payable 66
- Ultima II 39
- Kings Quest I, II or III .... ea 33
- Space Quest 33

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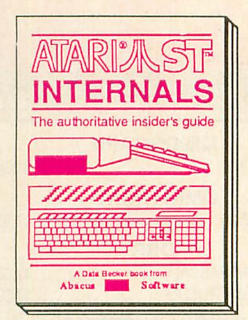
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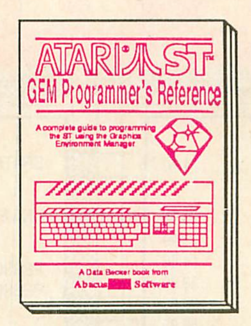
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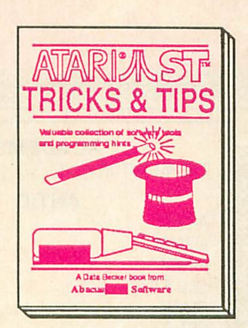
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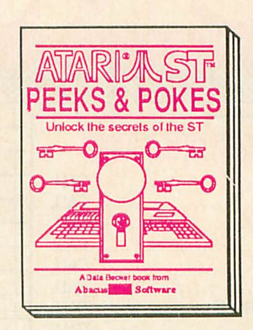
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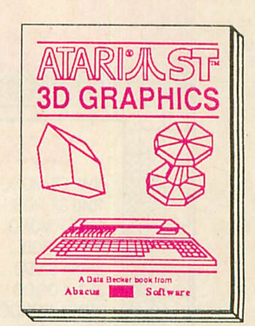
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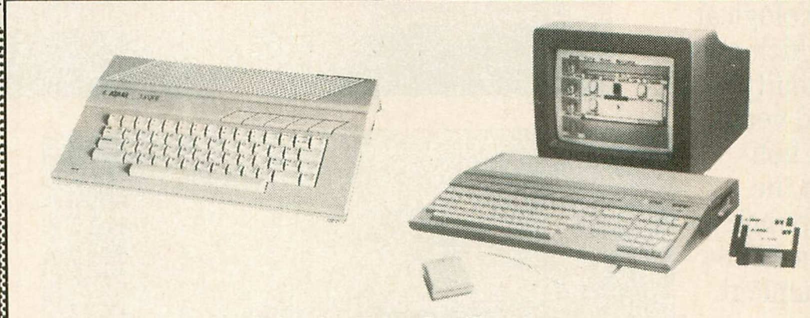
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GEM DIALOG
continued from page 75

dialog box is first displayed. We have *no* editable text in our box, so we pass in a zero. GEM will control and monitor all interaction with the displayed dialog box until the user clicks on one of the designated "exit" objects. GEM then returns the object's number to the program, which in our case gets

MegaMax C users should find little problem in converting this program from Alcyon C

placed into the variable called **button**.

When GEM passes control back to our program, we use the next 10 lines to test for exactly which object the user clicked on. Using our TOPUP button, the third line would detect when it was pressed for an exit and divert control to the function called **d_topup()**. The **do** loop construct will continue to activate the dialog box until the pressed exit button is the **quit** button.

form_dial(3 . . .) forces a redraw of the screen that was covered by the dialog box. When we fall out of the loop, the next line is **form_dial(2 . . .)**, which draws the "shrinking box" graphic onscreen, to show the utility closing. The screen is redrawn from the image which was saved in the **form_dial(0 . . .)** call earlier. Now that we want to leave the application, we set **finished** to TRUE, and return to the outermost loop, which will **terminate()** and exit.

FIND SIZES

The next function is **find_box_sizes()**, which uses an AES object library call named **objc_offset()** to discover the x,y coordinates of the upper left corner of the object you ask it for. In our case, for each number box we ask for, (TOPNUM, BOTNUM, CURRNUM, or SPEEDNUM), we also get the width and height of the box so we may use the described rectangle as a clipping window. If we did not, then every time we updated each number, GEM would redraw the entire dialog box, at a cost of 1-2 seconds.

UP AND DOWN

The next eight functions are called each time their function button is pressed. For example, **d_topup()** is called whenever the TOPUP button is pressed. The routine **d_topup()** simply increments the variable **top** and then calls **adjust()**, passing in the tree, object, string, and clipping rectangle wanted. All eight routines work the same, except for **d_curup()** and **d_curdn()**, which also have the responsibility of placing the control bytes out the PRINTER port.

ADJUSTABLE

The next function, **adjust()**, takes the value of the variable passed to it, changes the numeric value into an ASCII text string, then tells the dialog box where to find the just-created string of ASCII digits when it is needed for display.

The function **ftoa()** changes a numeric value into the ASCII string. MegaMax C users will want to substitute **sprintf()** for this call. Next, **set_text()** tells the dialog box where the newly created string is located, and **objc_draw()** redraws the number box object. Before we leave, **beep()** sounds a click from the speaker.

Right below is the **set_text()** function, for which I thank ANTIC ONLINE columnist Tim Oren for his help. This function needs the address of the ROOT of the dialog's tree, the number of the OBJECT you desire to change, and the address of the first byte of a null-terminated string of digits to show.

To begin, we declare **obj_specification** to be a pointer (*) to a TEDINFO structure. We then assign a value to this pointer by computing and retrieving the **ob_spec** value, which in this case points to the TEDINFO structure itself. Using this pointer to a structure, we assign to the structure entries **te_ptext** and **te_txtlen** the values for the address of the new string and the length of the new string.

The next two functions, **move_top()** and **move_bottom()**, describe how to perform timed, programmed moves of the camera stage to the top of available travel, or to the bottom. We set up a **for** loop to cover the range of travel desired, and then call **d_curup()** or **d_curdn()** as desired. Next to last, **beep()** takes a LO, HI, and loop length value and uses these to perform simple tones through the monitor speaker.

Finally, **terminate()** does just that; the only difference from every other **terminate()** call we've published so far is inclusion of a **rsrc_free()** call, which will disengage and free the memory we reserved for the resource file when we first started the program.

BY STEPHEN EVERMAN AND PAUL PRATT

DEDUCTION

Solve the mystery color patterns

Deduction is a classy ST BASIC adaptation of the old game most recently popularized as Master Mind. You must guess a pattern of four colors chosen by the computer. Each color can occur only once in the sequence. The game's concept is ancient, having been played in old England as Cows and Bulls, and more recently as Code-Breaker.

First type in DEDUCT.BAS, checking with ST TYPO, and SAVE a copy before you RUN it. Load ST BASIC and click on BASIC. PRG. Then load DEDUCT.BAS and click on "Run" in the appropriate window. This calls up a low-resolution color screen that interacts with the user via the mouse. (Sorry, Deduction does not run on the ST's high-resolution monochrome monitor.)

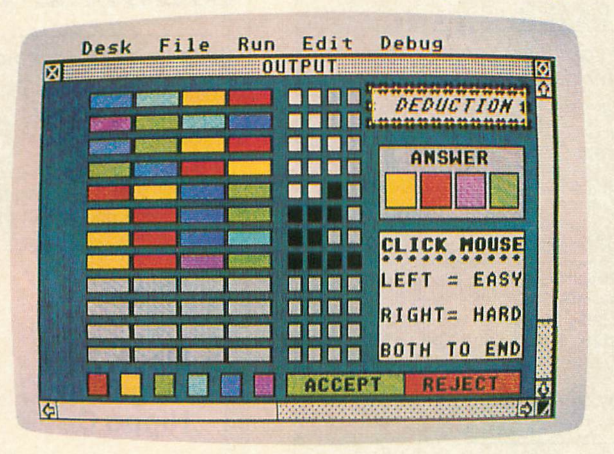
To begin deducing, click on the left button for the easy version of the game, or right button for the hard version. Both versions give you a choice of red, yellow, green, blue, cyan and violet. But the hard version also adds pink. This might not sound like a big difference, but with six colors, the odds are one in 360 that you'll get it right the first time. Adding a seventh color raises the odds to one in 840.

12 TRIES

You get 12 chances to guess the correct sequence. After you click on a color, that color is copied above in the first open rectangle on the left. Click on "Accept"—or "Reject" if you change your mind. The squares to the right of the four rectangles change color to indicate how close your guess was. White squares show that you got a color right, but in the wrong sequence. Black squares indicate that both the color and sequence are right.

From this, you can probably see that those high odds decrease drastically as you play—if you use your head. If you see two white squares, one black and one blank, you know that three colors are correct, but only one is in the right place. From there, you can see how that guess relates to previous guesses. Once you know where a color *isn't*, you should be able to piece the puzzle together and determine where each color *is*.

This pattern was deduced in eight moves. It's not always so easy.



But Deduction isn't a piece of cake. Just guessing randomly won't do. You might even try keeping track of your deductions on paper to help you see a pattern. But if you just work it all out in your head, you're still likely to guess correctly within 12 turns—if you play the game right.

Deduction follows last month's Hangman in a series of classic public domain games revamped for ST BASIC by Stephen Everman and Paul Pratt of Hayward, California. Their flashy version of Star Trek will appear in the February, 1986 issue of **Antic**.

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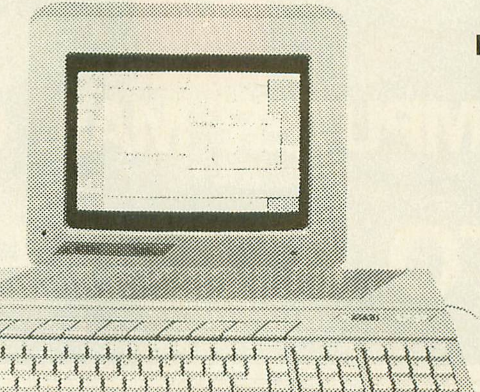
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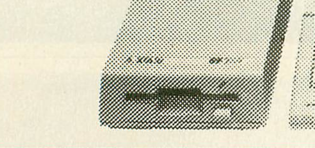
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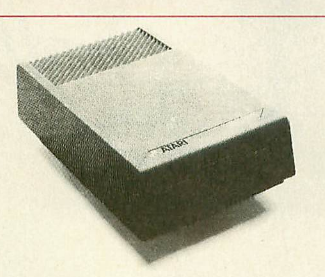
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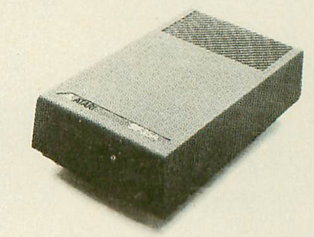


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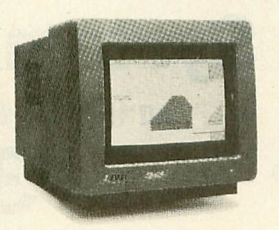


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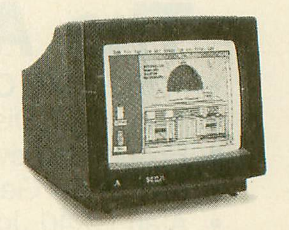


A state-of-the-art monochrome monitor. When you purchase your 520ST or 1040ST systems perhaps you'll choose the color monitor. Well, why not add a high-resolution monochrome display to your system. For word and data processing, there's no clearer, sharper display.

$189.00

No. AA5124

SC1224™ RGB Color Monitor



A high-performance RGB color monitor. The SC1224 faultlessly displays all 512 of the 1040ST's colors. No doubt its startling display of bit-mapped color graphics will knock your socks off.

$Call

No. AA51424



Call toll-free: 1 800 233-8950.

Outside the U.S.A. 717 327-9575 Telex 5106017898

All major credit cards accepted.

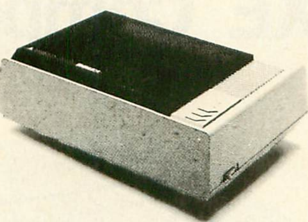
The 1040ST from Atari

The first one megabyte computer system for under $1000.

- Built-in 3½" double sided (720K drive)
- 1 Meg RAM
- 192K RAM w/TOS
- Bundled with Atari RGB monitor
- Includes ST language disk (Basic-Logo-Neochrome)
- Built-in power supply

$979.00

DOT-MATRIX GRAPHICS PRINTER



Offering an array of print styles, character pitches, column widths and page-length options, the SMM804 Printer allows you maximum versatility in formatting your written work. Plus—it's uniquely designed to support the 1040ST's print screen utility to transfer hi-res designs and pictures from the computer directly to the printer.

$189.00

No. AAXM804

HARD DISK DRIVE



Connecting this 20MB hard disk drive to your system lets you take advantage of the 1040ST's built-in, high-speed DMA channel (hard disk port). Data transfer (read/write) to and from the drive is virtually instantaneous. Think of it: high-speed data transfers and 20 Mbytes of disk storage—all at an incredibly low cost.

$729.00

No. AA51620



Call toll-free: 1 800 233-8950.

Outside the U.S.A. 717 327-9575 Telex 5106017898

All major credit cards accepted.

The Atari 130XE Computer

Atari has added a new slant to the world of computing. Beauty. Inside and outside. Brians and beauty combined to give you more of what you want from a personal computer. More graphics modes, colors, Random Access Memory, text modes, and independent sound voices than any other computer of its size. All in one stunning new body at a ver low price. The Atari 130XE has 131, 072 bytes of RAM. It uses the 6502C microprocessor and is software compatible with the thousands of programs available for the 800XL series.



No. AA130XE

$139.00

The Atari 800XL Computer



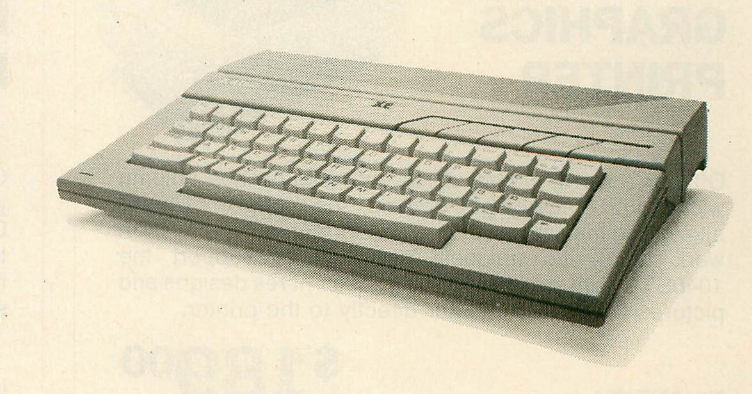
A powerful, versatile tool for work and play, the Atari 800XL Home Computer features built-in Atari Basic programming language, a full-stroke keyboard, a Help key and an international character set—plus built-in 64K memory. This additional memory gives the user access to over 2,000 software programs, while an expansion connection proves the potential for adding sophisticated peripherals. Teamed with the right Atari programs and peripherals, the 800XL can teach, entertain, program and help manage a home or business.

No. AA800X

$79.99

The Atari 65XE Computer

Atari has added a new slant to the world of computing. Beauty. Inside and outside. Brians and beauty combined to give you more of what you want from a personal computer. More graphics modes, colors, Random Access Memory, text modes, and independent sound voices than any other computer of its size. All in one stunning new body at a very low price. The Atari 65XE has 65,000 bytes of RAM. It uses the 6502C microprocessor and is software compatible with the thousands of programs available for the 800XL series.



No. AA65XE

$89.99



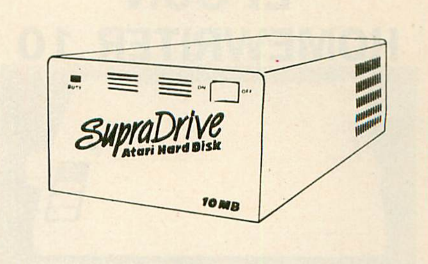
Call toll-free: 1 800 233-8950.

Outside the U.S.A. 717 327-9575 Telex 5106017898

All major credit cards accepted.

SUPRA Hard Drives for Atari Systems

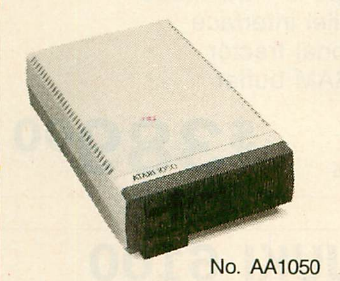
Hard Drive convenience for your Atari System. 10, 20 and 30 Meg hard drives available. Each includes controller, Atari interface, hard disk DOS, attractive case, cables and power supply.



No. SJ0007, **10MB for XL Series** $679.00

No. SJHD20ST, **20 MB for ST Series** $649.00

No. SJHD30ST, **30 MB for ST Series** $829.00



ATARI 1050 Disk Drive

A CMO Exclusive! While they last.

No. AA1050 $129.00

INDUS GT Disk Drive

The GT drive is compatible with the 400/800/1200 and XL series computers. Featuring full operation in either single or double density.

No. IADD $199.00





MAXELL 5¼" Diskettes

Single Sided, Double Density

No. MXD1

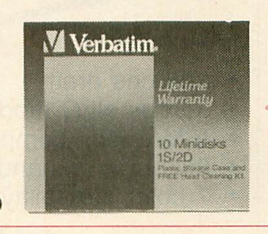
$10.99 Box of 10

VERBATIM

Single Sided, Double Density

5¼" Diskettes

Includes plastic storage case & head cleaner kit.



No. VE1

$8.99 Box of 10

SONY Bulk Pack

User's Group Special

50 Double Sided, Double Density 3½" Mini Diskettes.



No. SCMFD2P

$89.99

ICD Rambo XL

Turns your 800XL or 1200XL into a 256K System.

No. LAB04 $39.99

ICD Happy Archiver

Provides the owner with Archiver utilities. A must for serious hackers.

No. AB03 $36.99

ICD US Doubler

True double density and high speed for the 1050 drive.

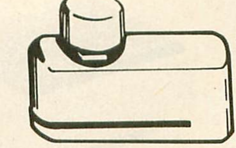
No. AB02 $49.99

DATA SHARE Disk Notcher

Cuts uniform tabs in double sided diskettes, allowing use of both sides in single sides drives.

No. XNOTCH

$6.99



ICD Sparta DOS Construction Set

No. AB04 $29.99

BIB Disk Drive Head Cleaning Kit

$14.99 No. HD-4 (3½")

$4.99 No. HD-5 (5¼")

Innovative Concepts Flip 'n File

Stand-up hard case holds 10 disks.

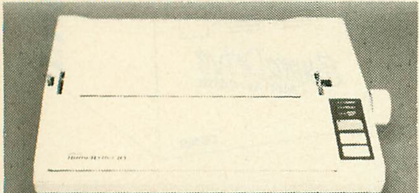
No. FF10D $1.99 ea.

AMARAY Diskette Storage Tubs

No. ARDT3, (3½" 30 Capacity) $8.19

No. ARDT5, 5¼" 50 Capacity) $8.49

EPSON HOMEWRITER 10



- 100 cps draft
- NLQ
- 80 column

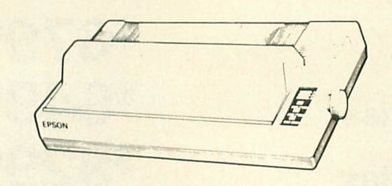
SPECIAL!

$99.99

No. EPHW10

with purchase of PIC Call CMO Sales Consultant for proper interface.

EPSON LX86

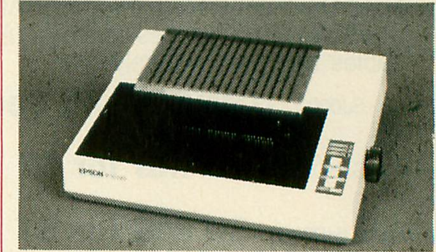


- 120 cps draft
- 16 cps in NLQ mode
- Parallel interface
- 80 column

NEW!

No. EPLX86 $249.00

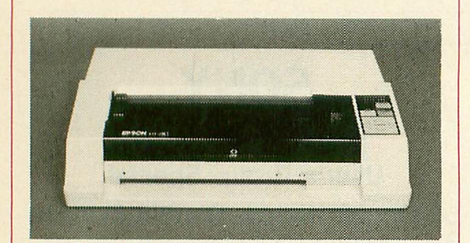
EPSON FX85



- 160 cps draft
- 32 cps in NLQ mode
- Parallel interface
- Optional tractor
- 8K RAM buffer

No. EPF85 $389.00

EPSON HI-80



- Uses 4 pens at a time with 10 colors available
- Draws at 9'' per second
- Includes HPGL
- Parallel interface

No. EPHI80 $359.00

JUKI 5510C

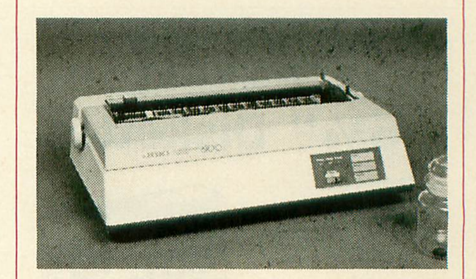


- 180 cps draft
- 30 cps NLQ mode
- IBM/Epson compatible
- 3K buffer expandable to 15K
- 7 color capability

COLOR!

No. JU5510C $469.00

JUKI 6100

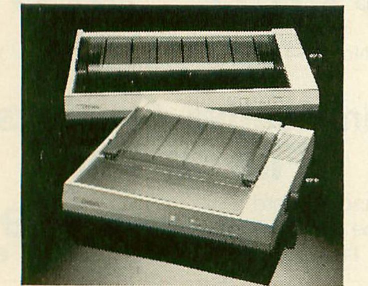


- 18 cps
- 2K Buffer standard
- 2400 MTBF rated
- Parallel interface

LETTER QUALITY!

No. JU6100 $439.00

CITIZEN MSP

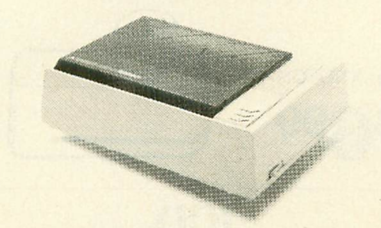


- 40 cps NLQ
- 160 cps draft
- Built-in tractor
- 1K buffer

No. CZMSP10 (80 col.) $299.00

No. CZMSP15 (132 col.) $419.00

ATARI XMM801 (for XE & XL) XMM804 (for ST)

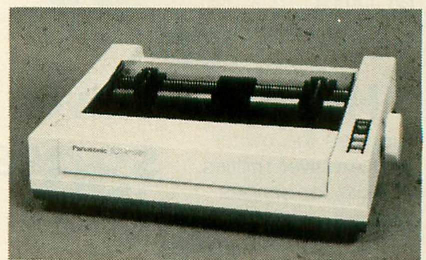


ATARI's NEW DOT MATRIX GRAPHICS PRINTER

No. AAXM801 $159.00

No. AAXM804 $189.00

PANASONIC KX-1091



- 120 cps, multiple mode NLQ
- 80 column, 1K buffer
- Tractor and friction feed

No. PA1091 $229.00

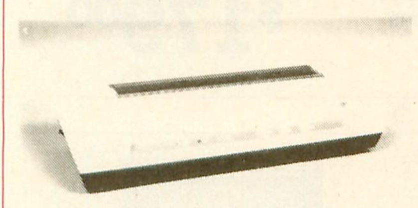


Call toll-free: 1 800 233-8950.

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All major credit cards accepted.

STAR LV1210 PRINTER

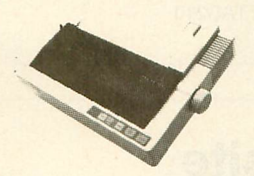


- 120 cps • IBM compatible
- Built-in tractor
- 80 column • Parallel Interface

$189⁰⁰

No. SGLV1210

STAR NX-10 PRINTER



- 120 cps • Bi-direction
- Logic seeking
- IBM Character set
- Friction and Tractor feed

$239⁰⁰

No. SGNX10

STAR SG-15 PRINTER

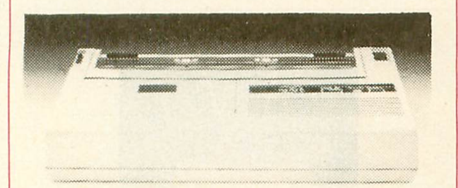


- 120 cps • 16K Buffer
- Wide Carriage

$399⁰⁰

No. SGSG15

OKIDATA OKIMATE 20



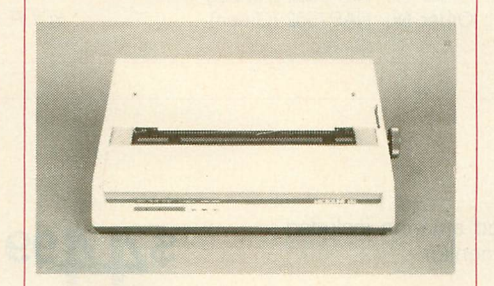
- Color Screen Print Software
- 80 cps Draft/40 cps NLQ
- 24 Element Print Head
- 80 Column, 8K Buffer

$139⁰⁰

No. OK20

w/purchase of Interface

OKIDATA 182

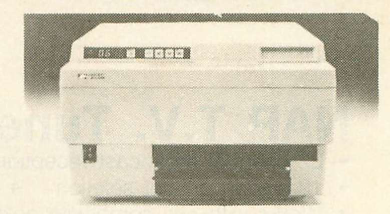


- 120 cps • 60 cps enhanced
- Adjustable pin feed
- Parallel Interface

$219⁰⁰

No. OK182

CANON LASER LBP-8A1

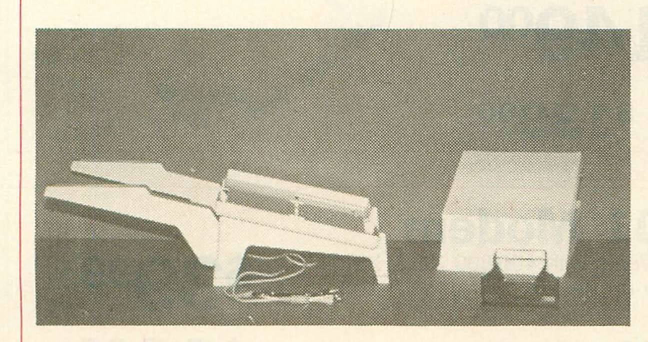


- 8 pages per minute
- High quality printing
- 16 fonts per page capability
- Diablo 630 emulation
- Parallel interface

$1999⁰⁰

No. CCLBP8

"Don't forget to order accessories for your printer."



Printer Stands **$14.99**

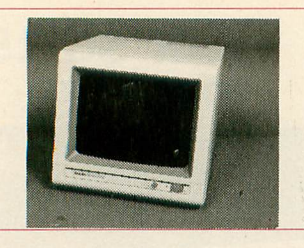
No. CUUPS1, Curtis Universal Printer Stand

Paper **$12.99**

No. RF591, 8½" x 11" Fan Fold

Ribbons - Please call a CMO sales consultant.

Interfaces - See page 9.



TAXAN Composite Color

- 14" Composite with audio • Resolution 350x500
- Comp. video, Chroma & Luma input connections

Order No. TAC210

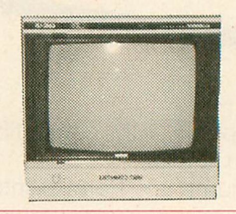
$179.00

MULTI-TECH Composite Monitor

- 13" Composite Color with non-glare filter

Order No. MO131

$159.00





NAP Amber/Green Composite

- 80 col. x 25 line • 900x245 line res.
- 20 MHz band width • Includes audio input

Order No. NAP7522 (Amber)
Order No. NAP7552 (Green)

YOUR CHOICE

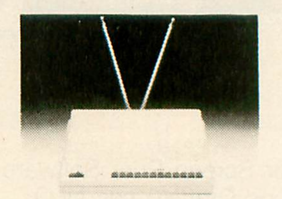
$79.99

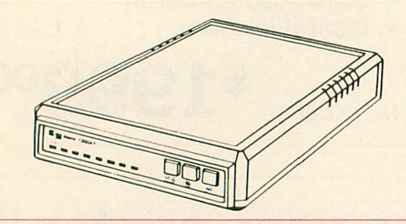
NAP T.V. Tuner

- 82 channel broadcast reception
- 12 station pre-set seletion • Rod antenna included
- Works with any composite color monitor

Order No. NAP7300

$44.99





SUPRA 1200AT Modem

- Works on Atari 800XL & XE Computers • 300/1200 Baud
- Hayes Command compatible • Autoanswer/Autodial
- Smart Terminal Software • Includes cables & AC adapter

Order No. SJ1200AT (LX & XE)
Order No. SJ1200ST (ST)

YOUR CHOICE

$159.00

ANCHOR 520 Modem

- 300/1200 BPS • Autoanswer/Autodial
- Designed for the Atari 520ST

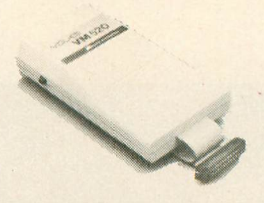
Order No. AN520

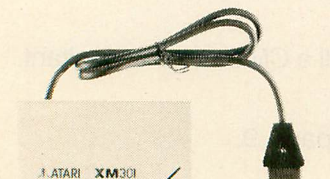
$149.00

Also Available:

ANCHOR Volksmodem No. ANVM **$59.99**

ANCHOR Volksmodem 300/1200 No. ANVM12 **$139.00**





ATARI XM301 Modem

- Autoanswer/Autodial • Works with 400-800 XL & XE
- Includes XE term program on disk

Order No. AAXM301

$39.99

ATARI 835 Modem

Order No. AAB835

$29.99

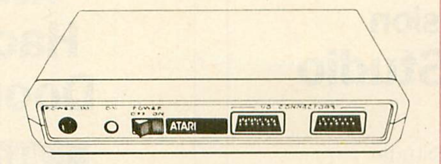


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ATARI 850 Interface



Features 4 serial ports & one 8 Bit parallel port. Programmable baud rates. The original Atari interface.

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$109.00

SUPRA Interface

Parallel interface for Atari Computers. Allows daisychaining of other peripherals.



Order No. SJ1150 **$44.99**

Order No. SJ1151 (1200XL) **$49.99**

ICD PR Connection

Low cost, compatible replacement for the Atari 850 Interface. Allows the use of standard RS232 modems & Centronics parallel printers.

Order No. ALICPR

$69.99

ICD Printer Connection

Baby brother to the PR Connection. Low cost interface for parallel printers.

Order No. ALICP

$44.99



A CMO EXCLUSIVE

AXLON RAM Expansion for Atari 400 & 800 Computers

32K designed for Atari 400 & 800 — **$29.99**
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48K designed for Atari 400 only — **$49.99**
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128K RAM Disk designed for 800 only — **$119.99**
Order No. ALA128

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6 Outlet Safe Strip — **$19.99**
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COMPUGUARD

4 Slot Surge/Spike Suppressor — **$14.99**
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SPECTRAVIDEO Joysticks

Quickshot I — **$6.99**
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Replacement Joystick — **$2.99**
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Access Software
Leader Board



$29.99

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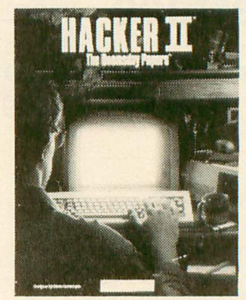
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Music Studio

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Activision
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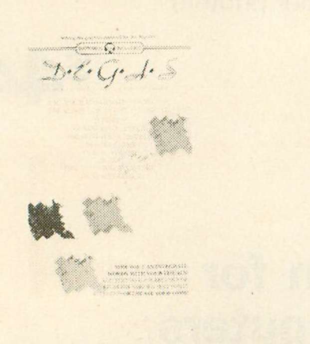


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No. ADAC02



Batteries Included
D•E•G•A•S



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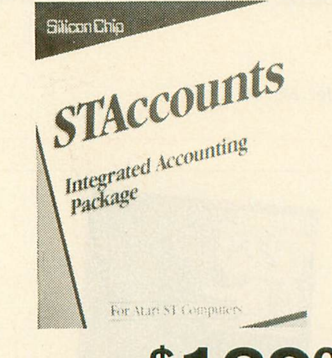
Cygnus
Starfleet I



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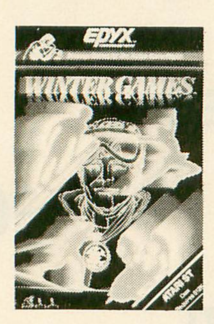
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STA Accounts



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Winter Games



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Haba
Hippo C



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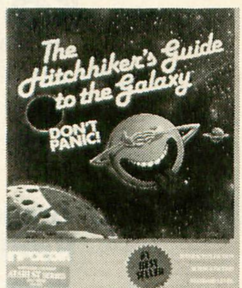
Haba
HabaWriter



$44.99

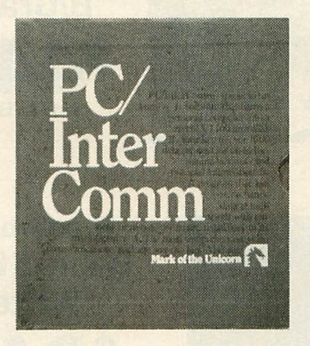
No. ADHA02

Infocom
Hitchiker's Guide To The Galaxy



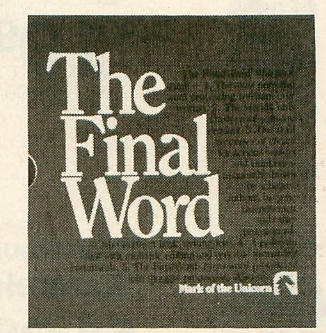
$29.99
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Mark of the Unicorn
PC/Intercom



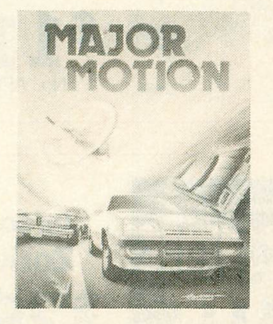
$89.99
No. ADMU01

Mark of the Unicorn
Final Word



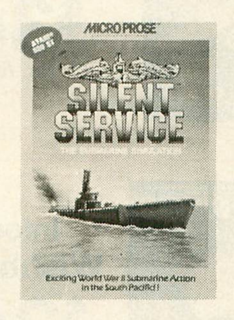
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Michtron
Major Motion



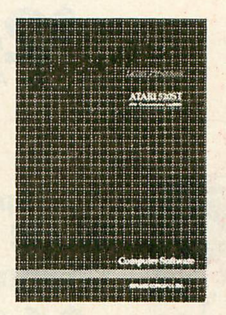
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No. ADMI01

MicroProse
Silent Service



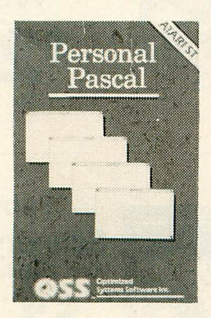
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Phantasie



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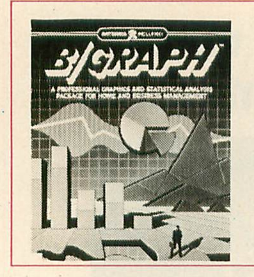
VIP Technologies
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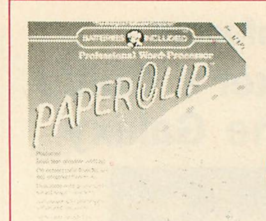
$119.00
No. ADVP01



Accolade Fight Night
$19.99
No. AFAC01



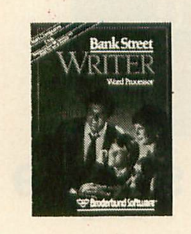
Batteries Included B/Graph
$44.99
No. AFBI01



Batteries Included Paperclip
$37.99
No. AFBI02



Broderbund Karateka
$19.99
No. AFBB01



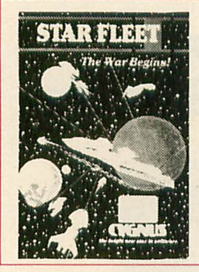
Broderbund Bank Street Writer
$34.99
No. AFBB02

The Print Shop

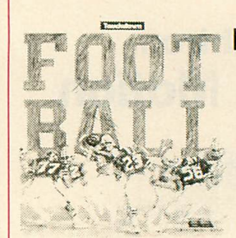
Broderbund Print Shop
$29.99
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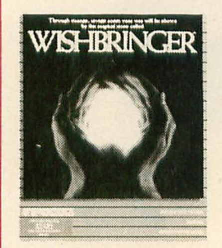
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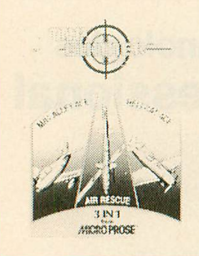
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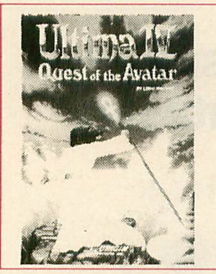
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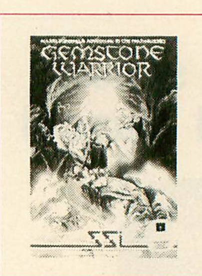
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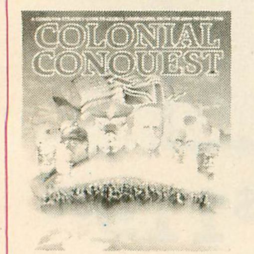
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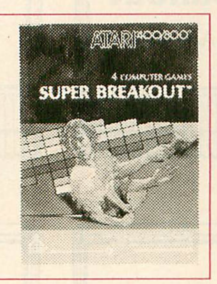
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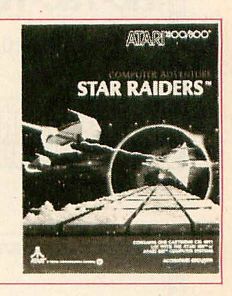
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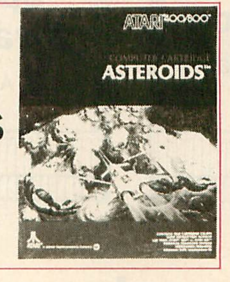
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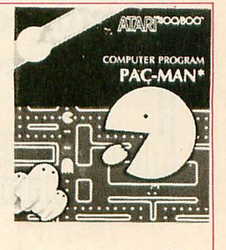
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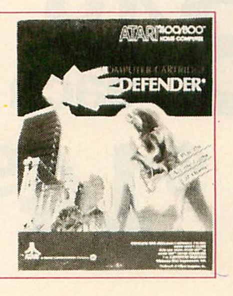
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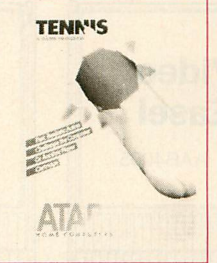
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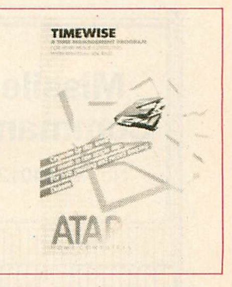
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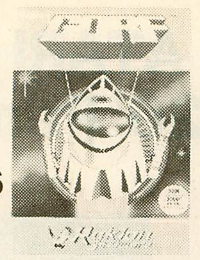
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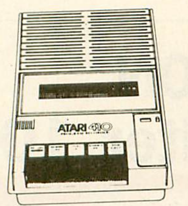
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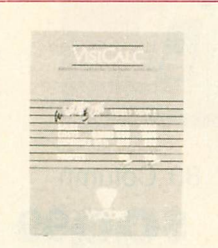
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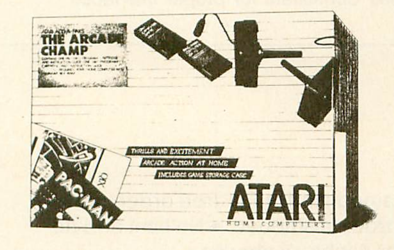
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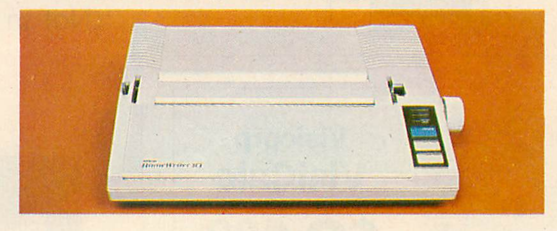
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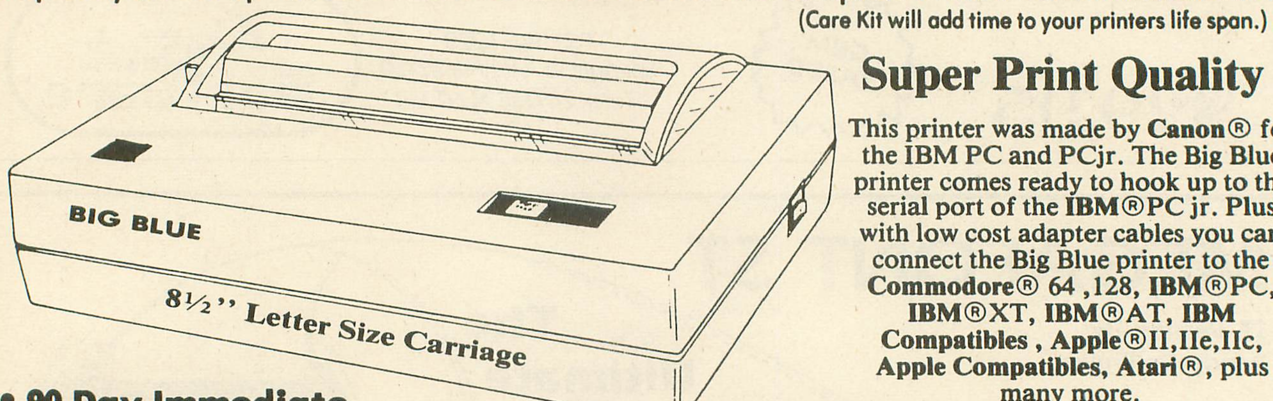
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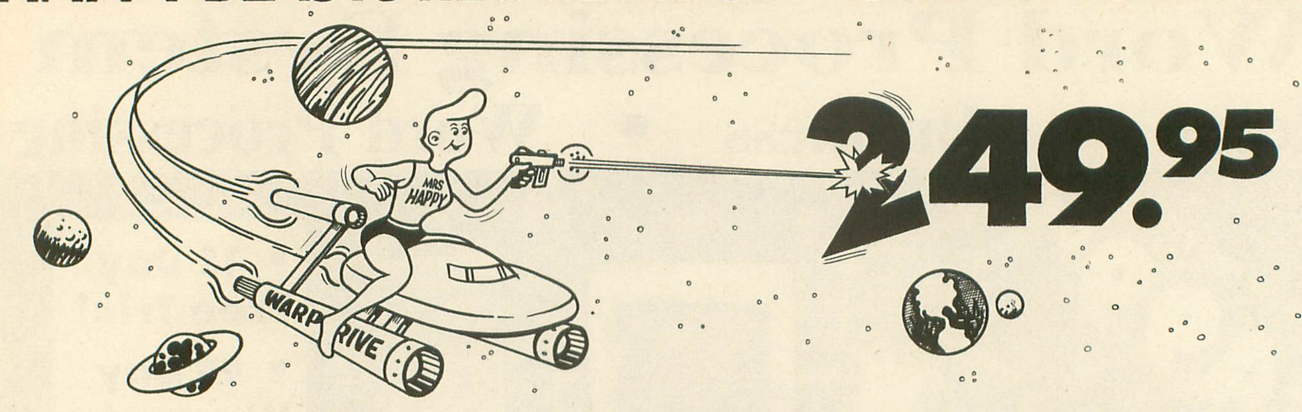
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CIRCLE **252** ON READER SERVICE CARD

Reviewed by David Plotkin

The **Atari ST BASIC Training Guide** is a first-class text for ST BASIC users. It is clear, thorough, well-written and remarkably free of errors and typos. It doesn't address some advanced features of ST BASIC, but does a good job on the subjects covered.

The first chapter leads you step by step through the process of creating a program, beginning with fundamentals such as the concepts of programs and algorithms. It continues with flowcharts, documentation, introduction to bits and bytes, and the hexadecimal system.

Successive chapters explain how to use various ST BASIC commands. The sections are short and easy to digest, just right for the beginner. Each chapter includes sample programs which adequately illustrate the concepts being explained. At various points in the chapter there are problems to test your understanding of the material. (Don't worry, the answers are in back.)

The Guide progresses from easier commands such as arithmetic and random numbers to more advanced commands such as IF/THEN, FOR/NEXT, GOSUB and GOTO. Good sections cover multi-dimensional arrays, disk files, sound and graphics, and using GEM VDI and AES commands for special effects. A good reference section lists the ST BASIC commands alphabetically, along with numerous examples.

This book does not go into great depth about the commands. Details of file structure and use of sequential and random files are not explained, and no mention of the complex WAVE command is made. The concept of partially RESTOREing data is also ignored.

The one serious error I spotted is in the reference section. Under the explanation of the NEW command, it says that the program still remains in memory after the NEW command is invoked. The novice who believes this is in for quite a nasty surprise, because NEW completely erases the program from memory.

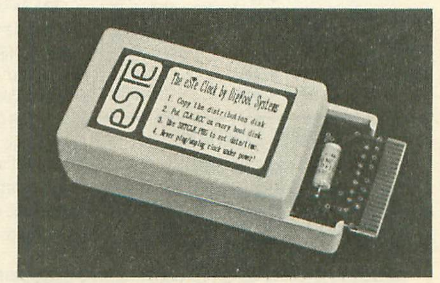
I like **ST BASIC Training Guide**. It does a good job of introducing the user to ST BASIC programming fundamentals. It also provides a valuable reference section for the more advanced user.

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CIRCLE 009 ON READER SERVICE CARD

the date or time independently of each other. The best part is having all your files correctly time/date-stamped when written. There won't be any more confusion over which file was written last.

The eSTe Clock Cartridge has two built-in EPROM sockets, so you can insert and run your own pre-programmed EPROM chips. (Otto Baade, who runs BigFoot Systems, says he can also supply blank, pre-etched, drilled, and socketed ST cartridge boards which accept and utilize up to four 2732, 2764, or 27128 EPROMS. Price for these boards runs $15 each in quantities up to 999.)

I like anything that works without me needing to read the directions. The eSTe Clock fills the bill and keeps good time too. When we used it with Flash!—which demands use of the clock while running—the correct time was automatically reset when we returned to the desktop. My only wish-list feature would be a cartridge slot built into the eSTe, so that I could use other cartridges without losing my eSTe Clock.

Sorry, but I somehow feel compelled to write this: It's my personal opinion that the eSTe is the beSTe ST plug-in clock yet.

ACTION PAK

Action Software
69 Clementina Street
San Francisco, CA 94105
(415) 974-6638
$39.95

CIRCLE **256** ON READER SERVICE CARD

Reviewed by Sol Guber

Action Pak consists of four utility programs that make labels for 3 1/2-inch disks, print banners, emulate a typewriter and convert SynFile+ data for the ST.

The menu-driven disk labeler lets you print the directory of the disk in drive A, B or C, using normal, italic or bold print and sorting the files alphabetically. You can rename the disk, change the border around the label, or just print the directory in 80-column format. Included with the package are 50 disk labels to get you started.

The banner program lets you print banners of up to four lines with as many as 72 characters each or send them to a disk file. For one-line banners the characters are about 64 asterisks high. On four-line banners, the size decreases to 16 asterisks. The disk contains four different fonts. The provided letters are slightly chunky and unattractive. But more fonts can be generated from Batteries Included's DEGAS or loaded from other sources.

The typewriter desktop accessory sends information directly to your printer. Just load the program and start typing. When you press [RETURN], that line is sent to the printer as shown, along with a line feed. You can delete characters before they are printed. This program can be used to address envelopes, fill out forms or write memos from within a program. It can also be used to send special characters to a printer to modify the printing.

Make labels or banners, emulate a typewriter and convert SynFile+ data

The SynFile+ converter lets you make ST conversions of files generated on Atari 8-bit computers with Broderbund's SynFile+ database. The six programs supported are Hippo-Simple, Zoomracks, dBMAN, H&D Base, dbOne and dbMaster. To use the program, either connect your ST to an 8-bit machine via null modem cable, or upload and download the files to and from a bulletin board.

The SynFile converter is easy to use and has many prompts to help you. As it runs it gives information about the file and the record count, and displays a running total of the records processed. Once the records have been converted to ST format, some massaging of the data may be needed to have them work properly.

All four programs are easy to learn, not copy-protected and have good documentation.

EZ-TRACK ST

Hybrid Arts
11920 W. Olympic Blvd.
Los Angeles, CA 90064
(213) 826-3777
$65

CIRCLE **251** ON READER SERVICE CARD

Reviewed by Chris Many

During the past three or four years, programs called sequencers have been the bridge between computers and synthesizers. These programs emulate computerized player-pianos, but can control a whole orchestra of synthesized sounds. **EZ Track ST** is a simple but sophisticated home-market sequencer from Hybrid Arts, who manufacture the 8-bit MIDImate system reviewed in **Antic**, June 1985.

It should be noted immediately that EZ Track does not access the Atari's internal sound chips at all. Playing music requires an external MIDI synthesizer, such as the Casio CZ-101 (approximately $300) or one of Yamaha's inexpensive new models. MIDI (Musical Instrument Digital Interface) is basically an electronics standard, such as serial and parallel computer interface standards. MIDI lets two or more synthesizers and computers "talk" to each other, translating musical notation into bits and bytes.

EZ Track is easy to use. Just connect your synthesizer to the MIDI In and MIDI Out ports on the back of the ST, click the start button, play a few notes and click the store button— you've recorded your first bit of music. Move to another track and add a bass line, click, click. Add a lead line on a third track, click, click. Three-part harmony in minutes. It's that easy.

To correct mistakes, just redo the tracks until you're satisfied. EZ Track's forward, record and pause controls and time counter all function identically to those on your home cassette

continued on next page

recorder. In fact, the whole program operates much like a multi-track tape recorder—except that it records musical information *digitally*.

With 20 recording tracks available, the possibilities seem almost endless. You can record up to 28,000 notes on a 520ST, and an amazing 63,000 on a 1040ST. Included in this program are several advanced features usually found only on high-end professional sequencers. A technique called quantizing lets you automatically smooth the timing of awkwardly-played notes, correct to the nearest 32nd-note.

For example, if you are playing a pattern of eighth notes and you want each note to fall precisely on the beat, it's easy to correct any minor fingering errors. You can copy music from one track to another and even combine tracks with no loss of musical clarity.

Tempo adjustment also helps makes recording easier. Playing *The Flight of the Bumblebee* at full speed is no mean feat, so just slow down the tempo to where it's comfortable for you. When you speed up the playback, you'll sound like a virtuoso.

You can also assign any track a MIDI channel—up to 16 are available. For example, if you have a synthesizer playing an electric piano sound, then everything that comes out of EZ Track will sound like an electric piano. But if you tune one track to MIDI channel 1, (electric piano) and tune another track (bass) to channel 2, then tune one synthesizer (electric piano) to channel 1 and your *second* synthesizer (bass) to channel 2, you'll get two distinct sounds.

Operates like a multi-track tape recorder—but it records *digitally*

Yes, it gets expensive this way, so some companies make synthesizers that can play more than one sound at the same time. Casio's CZ-101 is probably the most affordable example.

All functions are readily acessible through the mouse or the ST keyboard. Normal disk access and file manipulation are available from within the program.

My only disappointment with EZ Track is the lack of cut-and-paste. Most simple 8-bit home music programs include this feature, which makes composition much easier. However, according to Hybrid Arts, this and many other features will be included on the upcoming MIDItrack ST and MIDItrack ST Professional.

Right now, EZ Track ST is the best sequencer available for the ST—an excellent, simple program. It brings a number of advanced features to the amateur musician and bridges the gap between high-tech music and an affordable, well-presented home program.

BY GREGG PEARLMAN, ANTIC JUNIOR EDITOR

LATE NEWS FLASHES

Cartridge-based **Fast BASIC** is quick, powerful and easy to use, yet requires surprisingly little memory. The **Antic** technical staff is thoroughly impressed by our beta version. The language features *keyword* support of BIOS and XBIOS calls and makes good use of the GEM interface.

Computer Concepts, Gaddesden Place, Hemel Hempstead, Herts HP2 6EX, England. (0442) 63933. BETA.

CIRCLE **281** ON READER SERVICE CARD

On the day we closed this issue, Atari began shipping the ST version of their classic 8-bit game **Star Raiders**. The software is described as a faithful expansion of the original Star Raiders that uses the full power of the ST.

$34.95 Atari Corp., 1196 Borregas Avenue, Sunnyvale, CA 94086. (408) 745-2000. FINAL.

CIRCLE **282** ON READER SERVICE CARD

MIDI

Midiplay stores more than 200,000 MIDI notes/events—approximately three hours of music—in 1Mb of RAM. A real-time record/playback system, Midiplay supports all 16 channels of MIDI information including velocity, key and channel aftertouch, pitch bend, program changes and all 128 MIDI controllers such as pedals. With Midiplay you can record and play back your own music from any MIDI keyboard or synthesizer, change the musical key, tempo and timbre of the playback independently, even retrieve music files from disks to create medleys.

$49.95. Electronic Music Publishing House Inc., 2210 Wilshire Blvd., Santa Monica, CA 90403. (213) 455-2025. FINAL.

CIRCLE **271** ON READER SERVICE CARD

SYS/EX is a universal and generic MIDI librarian that lets musicians store songs to disk. It works with about 60 different synthesizers, samplers, drum machines and other MIDI instruments. Files from different MIDI instruments can be appended from simultaneous uploading. MIDI dump files can be constructed from within the software.

$150. Key Clique, 3960 Laurel Canyon Blvd. Suite 374, Studio City, CA 91604. (818) 905-9136. FINAL.

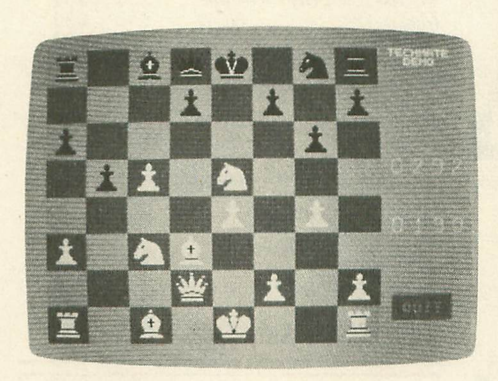
CIRCLE **272** ON READER SERVICE CARD

MEGABYTE UPGRADE

EZRAM 520, a 512K memory upgrade kit, increases the RAM of the 520ST to 1Mb, improves the ST's capacity to process memory-intensive applications such as spreadsheets and databases and makes disk access more efficient through larger RAM-disk space. EZRAM 520 comes with a memory-check diagnostic program, three additional accessory programs and an entertainment program. Soldering is required.

$199. Terrific Peripherals, 17 St. Mary's Court, Brookline, MA 02146. (617) 232-2317. PRESS.

CIRCLE **277** ON READER SERVICE CARD



ST CHESS

TechMate Chess from Szabo Software is completely mouse-driven and boasts a powerful new algorithm for speedy, competitive play. Crisp RGB color graphics are featured, the program does not work on monochrome monitor. Each side has an adjustable tournament clock. The software plays under complete official F.I.D.E. chess rules.

$49.95. Szabo Software, P.O. Box 623, Borrego Springs, CA 92004. FINAL.

CIRCLE **270** ON READER SERVICE CARD

K-RESOURCE EDITOR

Kuma Software announces **K-Resource**, a complete resource editor for creating and updating AES icon resource files. The program operates fully through GEM and is a powerful tool for customizing the GEM interface for new applications programs in either monochrome or color. It features an Icon/Image Editor with auto-snap and auto-size. K-Resource produces files for inclusion in C, Pascal, Modula 2 and Fortran 77.

$39.95 in British pounds. Kuma Software, 12 Horseshoe Park, Pangbourne, Berks RG8 7JW, England. 07357 4335.

CIRCLE **283** ON READER SERVICE CARD

UNIX SHELL

MT C-Shell is a multitasking, multiuser operating system that runs TOS programs in a fully TOS-compatible file system. Included is the powerful UNIX C Shell and a full-featured set of UNIX commands. The software supports remote dumb terminals via modem and is compatible with Micro RTX TOS. Each user can run several tasks concurrently, both real-time and time-shared. The program supports existing compilers, linkers and editors.

$129.95. Beckmeyer Development Tools, 592 Jean Street #304, Oakland, CA 94610. (415) 658-5318. PRESS.

CIRCLE **273** ON READER SERVICE CARD

Pecan Software Systems has introduced a enhanced implementation of Softech Mirosytems' **UCSD Pascal Power System**, a development environment with facilities for creating and running application programs on a variety of machines and operating systems including MS-DOS. A Modula-2 compiler is under development.

Pecan Software Systems Inc., 1410 39th Street, Brooklyn, NY 11218. (718) 851-3100. FINAL. PRESS.

CIRCLE **274** ON READER SERVICE CARD

FAST/BASIC GEM

Version 1.35 of **Philon Fast/BASIC-M** now fully supports the GEM VDI graphics interface. Graphics output is produced by using PEEKS and POKES into VDI.

$129. Philon Inc., 641 Avenue of the Americas, New York, NY 10011. (212) 807-0303. PRESS

CIRCLE **276** ON READER SERVICE CARD

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*New ST product notices are compiled from information provided by the products' manufacturers. **Antic** assumes no responsibility for the accuracy of these notices or the performance of the product. Each mention is followed by a code word indicating that, at press time, **Antic** had seen a FINAL marketable version, near-final BETA, earlier ALPHA, incomplete DEMO, or PRESS release.*

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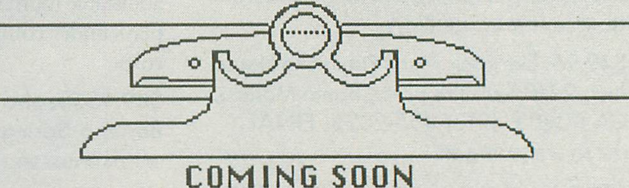
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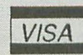
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CIRCLE 068 ON READER SERVICE CARD

SOFTWARE LIBRARY

Antic type-in listing section includes every full-length program from this issue. Listings are easier to type and proofread, easy to remove and save in a binder if you wish.

DISK SUBSCRIBERS: Programs for 8-bit Atari computers can be used immediately. Just follow instructions in the accompanying magazine articles. ST Owners: See monthly disk's ST Help File for instructions on how to transfer programs to 3-1/2 inch disk.

Antic program listings are typeset on the Star's SB-10 printer—from Star Micronics, Inc., 200 Park Avenue, New York, NY 10166.

TYPING SPECIAL ATARI CHARACTERS

Antic printed program listings leave a small space between each Atari Special Character for easier reading. Immediately below you will see the way **Antic** prints all the standard Atari letters and numbers, in upper and lower case, in normal and inverse video.

ABCDEFGHIJKLMNOPQRSTUVWXYZ
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
abcdefghijklmnopqrstuvwxyz
0123456789 0123456789

The Atari Special Characters and the keys you must type in order to get them are shown in the two boxes below.

NORMAL VIDEO

FOR THIS	TYPE THIS	FOR THIS	TYPE THIS
	CTRL ,		CTRL S
	CTRL A		CTRL T
	CTRL B		CTRL U
	CTRL C		CTRL V
	CTRL D		CTRL W
	CTRL E		CTRL X
	CTRL F		CTRL Y
	CTRL G		CTRL Z
	CTRL H		ESC ESC
	CTRL I		ESC CTRL -
	CTRL J		ESC CTRL =
	CTRL K		ESC CTRL
	CTRL L		ESC CTRL *
	CTRL M		CTRL .
	CTRL N		CTRL ;
	CTRL O		CTRL =
	CTRL P		ESC SHIFT CLEAR
	CTRL Q		ESC DELETE
	CTRL R		ESC TAB

INVERSE VIDEO

FOR THIS	TYPE THIS	FOR THIS	TYPE THIS
	[Atari logo] CTRL ,		CTRL X
	[Atari logo] CTRL A		CTRL Y
	[Atari logo] CTRL B		CTRL Z
	[Atari logo] CTRL C		ESC SHIFT CLEAR
	[Atari logo] CTRL D		ESC SHIFT INSERT
	[Atari logo] CTRL E		ESC CTRL TAB
	[Atari logo] CTRL F		ESC SHIFT TAB
	[Atari logo] CTRL G		[Atari logo] CTRL .
	[Atari logo] CTRL H		[Atari logo] CTRL ;
	[Atari logo] CTRL I		[Atari logo] SHIFT
	[Atari logo] CTRL J		ESC CTRL 2
	[Atari logo] CTRL K		ESC CTRL DELETE
	[Atari logo] CTRL L		ESC CTRL INSERT
	[Atari logo] CTRL M		
	[Atari logo] CTRL N		
	[Atari logo] CTRL O		
	[Atari logo] CTRL P		
	[Atari logo] CTRL Q		
	[Atari logo] CTRL R		
	[Atari logo] CTRL S		
	[Atari logo] CTRL T		
	[Atari logo] CTRL U		
	[Atari logo] CTRL V		
	[Atari logo] CTRL W		

Whenever the CONTROL key (CTRL on the 400/800) or SHIFT key is used, *hold it down* while you press the next key. Whenever the ESC key is pressed, *release* it before you type the next key.

Turn on inverse video by pressing the Reverse Video Mode Key . Turn it off by pressing it a second time. (On the 400/800, use the Atari Logo Key instead.)

Among the most common program typing mistakes are switching certain capital letters with their lower-case counterparts—you need to look especially carefully at P, X, O and 0 (zero).

Some of Atari Special Characters are not easy to tell apart from standard alpha-numeric characters. Usually the Special Characters will be boxed. Compare the two sets of characters below:

SPECIAL		STANDARD	
	CTRL F	/	/
	CTRL G	\	SHIFT +
	CTRL N	—	SHIFT -
	CTRL R	-	-
	CTRL S	+	+

HOW TO USE TYPO II (8-BIT)

TYPO II automatically proofreads **Antic**'s type-in BASIC listings for 8-bit Atari computers. It finds the exact line where you made a program typing mistake.

Type in TYPO II and SAVE a copy to disk or cassette. Now type GOTO 32000. When you see the instruction on the screen, type in a single program line **without the two-letter TYPO II code** at the left of the line number. Press the [RETURN] key.

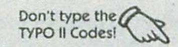
Your line will reappear at the bottom of the screen with a two-letter TYPO II code on the left. If this code is not exactly the same as the line code printed in the magazine, you mistyped something in that line.

To call back any line previously typed, type an asterisk [*] followed (without in-between spaces) by the line number, then press [RETURN]. When the complete line appears at the top of the screen, press [RETURN] again. This is also the way you use TYPO II to proofread itself.

To LIST your program, press [BREAK] and type LIST. To return to TYPO II, type GOTO 32000.

To remove TYPO II from your program, type LIST "D:FILENAME",0,31999 [RETURN] (Cassette owners LIST "C:). Type NEW, then ENTER "D:FILENAME"[RETURN](Cassette—ENTER "C:). Your program is now in memory without TYPO II and you can SAVE or LIST it to disk or cassette.

LISTING 1




```
WB 32000 REM TYPO II BY ANDY BARTON
VM 32010 REM VER. 1.0 FOR ANTIC MAGAZINE
HS 32020 CLR :DIM LINE$(120):CLOSE #2:CLO
   SE #3
BN 32030 OPEN #2,4,0,"E":OPEN #3,5,0,"E"
YC 32040 ? "↖":POSITION 11,1:? "TYPO II"
EM 32050 TRAP 32040:POSITION 2,3:? "Type
   in a program line"
HS 32060 POSITION 1,4:? " ":INPUT #2;LINE
   $:IF LINE$="" THEN POSITION 2,4:LIST B
   :GOTO 32060
XH 32070 IF LINE$(1,1)="*" THEN B=VAL(LIN
   E$(2,LEN(LINE$))):POSITION 2,4:LIST B:
   GOTO 32060
TH 32080 POSITION 2,10:? "CONT"
MF 32090 B=VAL(LINE$):POSITION 1,3:? " ";
NY 32100 POKE 842,13:STOP
CN 32110 POKE 842,12
ET 32120 ? "↖":POSITION 11,1:? " TYPO II 
   ":POSITION 2,15:LIST B
CE 32130 C=0:ANS=C
QR 32140 POSITION 2,16:INPUT #3;LINE$:IF
   LINE$="" THEN ? "LINE ";B;" DELETED":G
   OTO 32050
VV 32150 FOR D=1 TO LEN(LINE$):C=C+1:ANS=
   ANS+(C*ASC(LINE$(D,D))):NEXT D
WJ 32160 CODE=INT(ANS/676)
JW 32170 CODE=ANS-(CODE*676)
EH 32180 HCODE=INT(CODE/26)
BH 32190 LCODE=CODE-(HCODE*26)+65
HB 32200 HCODE=HCODE+65
IE 32210 POSITION 0,16:? CHR$(HCODE);CHR$
   (LCODE)
VG 32220 POSITION 2,13:? "If CODE does no
   t match press  RETURN  and edit line a
   bove.":GOTO 32050
```

ERROR FILE

WEFAX SOURCES

Radio Shack is discontinuing the XR2211 chip specified for the WEFAX Interface Board (September, 1986). The XR2211 is a generic chip that can be found at a number of large electronics suppliers and mail-order dealers.

FILE MASTER

Disk subscribers should load *File Master* (August, 1986) from DOS and copy it to another disk. It does not RUN properly from the monthly disk menu.

If you have the *File Master* lockup problem that occurs under some combinations of DOS's and disk drives, change the 100 in line 2625 to a 90.

MICRO JULIUS

For some dates, *Micro Julius* (June, 1986) puts in the wrong day of the week. To cure this, type in the following one-line fix:

```
WF 830 DIF=(DOW-D)/7:DIF=2*INT(7*(DIF-INT
   (DIF))+0.5)+1
```

HOW TO USE TYPO ST

TYPO ST is the automatic proofreading program for checking **Antic's** ST BASIC type-in listings. It finds any program line where you made a typing mistake.

Type in TYPO ST and SAVE a copy to disk before you RUN it. Now type RUN in the command window and press the [RETURN] key, or click on RUN from the RUN menu.

TYPO ST first asks for the name of the file to check. Type the desired filename and press [RETURN]. (TYPO ST will proofread itself if you type TYPOST.BAS as the filename.) Next, TYPO ST asks where you want the TYPO table printed. Type [S] [RETURN] for Screen, or [P] [RETURN] for Printer.

TYPO ST now reads your ST BASIC program and prints out a table of four-number codes—and the line number for each code. Compare your printed TYPO ST table with the **Antic** TYPO ST table published at the end of the program you are checking. If any of your four-number codes don't match the magazine's codes, you have made a typing mistake somewhere in that line. Carefully recheck your line against the published version.

Antic uses a word processor to format ST BASIC listings for publication, so we can indent lines and make the program structure more understandable. ST BASIC doesn't allow indentation and will strip off any spaces between the line number and the first BASIC instruction. Therefore, TYPO ST ignores space characters and does not care how far instructions are spaced apart.

TYPO ST cannot determine if two different characters have been switched within a line. For example, PRINT and PRNIT will look the same to TYPO ST. However, ST BASIC itself catches this error and points it out to you.

```
1000   ' TYPO/ST, (c) 1986 Antic Publishing, by Bill Marquardt
1010    DISK=1: OUTPUT=2: TRUE=(-1): FALSE=0: CHECKSUMMING=TRUE
1020    TV=FALSE: PRINTER=FALSE
1030    print "File to Check:": input FILENAME$: print "Output on:"
1040    print "(S)creen or ": print "(P)rinter ": input DEVICE$
1050    if( DEVICE$="p" )or( DEVICE$="P" )then PRINTER=TRUE else TV=TRUE
1060    if TV then print "Checksum for file: ": print FILENAME$: print
1070    if PRINTER then lprint "Checksum for file: ";FILENAME$: lprint
1080    open "I", #DISK, FILENAME$
1090    while CHECKSUMMING
1100       LINENUMBER=0: CHECKSUM=0: gosub GETALINE
1110       DECIMAL=CHECKSUM: gosub DECTOHEX
1120       OUTPUT$=str$( LINENUMBER )+" :"+HI$+LO$
1130       if PRINTER then lprint OUTPUT$ else print OUTPUT$
1140    wend
1150    close DISK
1160   end
1170   GETALINE:
1180    BLINE$="": on error goto 1150
1190    GOTALINE=FALSE
1200    while not GOTALINE
1210       line input#DISK, BLINE$: if len( BLINE$ )>1 then GOTALINE=TRUE
1220    wend
1230    LINENUMBER=val( BLINE$ )
1240    for CHAR=1 to len( BLINE$ )
1250       OK=TRUE: CHARACTER$=mid$( BLINE$, CHAR, 1 )
1260       if CHARACTER$=" " then OK=FALSE
1270       if OK then CHECKSUM=CHECKSUM+asc( CHARACTER$+chr$( 0 ))
1280    next CHAR
1290   return
1300   DECTOHEX:
1310    DECIMAL=abs( DECIMAL )
1320    HI=int( DECIMAL/256 ): LO=( DECIMAL-( HI*256 ))
1330    HH=int( HI/16 ): HL=( HI-( HH*16 ))
1340    LH=int( LO/16 ): LL=( LO-( LH*16 ))
1350    HI$=chr$( 48+HH-( 7*( HH>9 )))+chr$( 48+HL-( 7*( HL>9 )))
1360    LO$=chr$( 48+LH-( 7*( LH>9 )))+chr$( 48+LL-( 7*( LL>9 )))
1370   return
```

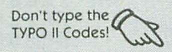
1000 :110B	1060 :13E7	1120 :0A48	1180 :089A	1240 :079B	1300 :0352	1360 :0C29
1010 :0EA2	1070 :140E	1130 :1000	1190 :04C6	1250 :0AEB	1310 :0667	1370 :036B
1020 :071B	1080 :0713	1140 :0274	1200 :0680	1260 :08BB	1320 :0B13	
1030 :12D2	1090 :0661	1150 :0408	1210 :11B9	1270 :0F36	1330 :07E3	
1040 :10E6	1100 :0BBD	1160 :01FF	1220 :0273	1280 :03A8	1340 :0804	
1050 :11A2	1110 :09F0	1170 :034C	1230 :0716	1290 :036C	1350 :0C0E	

scrolling scenery fools the eye

LANDSCAPE ILLUSION

Article on page 67

LISTING 1




```
IM 10 REM GOIN' WEST
XV 20 REM BY JOE BRZUSZEK
GL 30 REM (c) 1986, ANTIC PUBLISHING
OC 40 GRAPHICS 23:X1=0:POKE 559,X1:DL=PEE
   K(560)+PEEK(561)*256+4:POKE DL-1,68
AN 50 FOR X=2 TO 40:POKE DL+X,112:NEXT X:
   POKE 708,22:POKE 709,X1:POKE 710,X1:PO
   KE 711,24
TX 60 POKE 82,X1:POKE 87,X1:? "▛        ▼GOI
   N' WEST          parallax simulator"
UI 70 POKE 559,34:FOR X=40 TO 2 STEP -1:F
   OR Y=96 TO X1 STEP -16:POKE DL+X,Y:NEX
   T Y:POKE DL+X,7:NEXT X
EH 80 FOR X=6 TO 9:POKE DL+X,2:NEXT X:? "
   ▼▶   An optical illusion▼▲▶      by Joe
    Brzuszek▼▲";
TQ 90 ? "▶Created for ANTIC Magazine▼▲▶
        Dec. 1986▼press start":POKE 709,
   26
QR 100 IF PEEK(53279)<>6 THEN 100
HF 110 POKE 559,X1:? "▛":POKE DL-1,68:FOR
    X=66 TO 70:POKE DL+X,112:NEXT X
FS 119 REM SET UP DISPLAY LIST
DT 120 FOR X=3 TO 63 STEP 3:POKE DL+X,84:
   NEXT X:POKE DL+2,128:POKE DL+24,212:PO
   KE DL+36,212:POKE DL+45,212
KO 130 Y1=PEEK(DL)+PEEK(DL+1)*256+80:GOSU
   B 1000:Y1=Y1-4
AY 140 FOR X=4 TO 64 STEP 3:Y=INT(Y1/256)
   :POKE DL+X+1,Y:POKE DL+X,Y1-Y*256:Y1=Y
   1+80:NEXT X
BC 149 REM READ COLOR DATA
NZ 150 READ C$:FOR X=1 TO LEN(C$):POKE 70
   3+X,ASC(C$(X,X)):NEXT X
RF 159 REM READ PLAYER DATA
IX 160 READ X,Y,Y1:POKE 53248,X:POKE 5324
   9,X:POKE 53250,160:POKE 53256,Y:POKE 5
   3257,Y:POKE 53258,Y1
XX 170 Y1=PEEK(106)-48:POKE 54279,Y1:Y1=Y
   1*256:POKE 53277,2:POKE 623,2
EV 179 REM MIRROR
ZA 180 READ C$:FOR X=1 TO LEN(C$):POKE Y1
   +1197+X,ASC(C$(X,X))-1:POKE Y1+1448+X,
   ASC(C$(X,X)):NEXT X
HC 190 READ C$:FOR X=1 TO LEN(C$):POKE Y1
   +1500+X,ASC(C$(X,X)):NEXT X
SM 199 REM SUN
IA 200 READ C$:FOR X=1 TO LEN(C$):POKE Y1
   +1600+X,ASC(C$(X,X)):NEXT X
ZV 209 REM INITIALIZE VBI
XN 210 Y=USR(ADR("h-1□┐0┐Q-0□┐N┴i┘┐P╳//Qi
   ▼┐Q)▼┐K┐L┐M┐A█/1Ni(▀9/█▼1Ni(▀:/█)1Ni(▀
   A/)\█&▀/ \d♦"))
WX 219 REM INIZIALIZE DLI
FS 220 POKE 512,X1:POKE 513,6:POKE 54286,
   192:POKE 559,63:SOUND X1,60,2,6
PK 230 POKE 16,112:POKE 53279,112
NR 240 GOTO 240
GF 1000 DIM C$(840),C1$(100):FOR X=X1 TO
   5:READ C1$:C$(X*100+1)=C1$:NEXT X:X=PE
   EK(106)-36:POKE 756,X
KK 1009 REM MOVE CHARACTER SET
DM 1010 Y=USR(ADR("hh┐@h┐Ph┐0h┐N)♦┐L)▼┐K(
   ▀□1KrNHPyfLf0JPr▀□1PrNfPP□fQfNPrf0JPM●
   "),ADR(C$),X*256)
IS 1020 FOR X=X1 TO 8:READ C1$:C$(X*100+1
   )=C1$:NEXT X
JG 1029 REM DOUBLE SCREEN DATA
CC 1030 Y=USR(ADR("hh┐0h┐Nh┐Qh┐P)▄┐e▀(█▼1
   NrP█(rPfPP□fQfNP□f0JPgFeP□/P┴i(┐P╳XfQP
   T●"),ADR(C$),Y1):C$=""
FL 1039 REM PUT DLI AND VBI IN PAGE 6
ED 1040 FOR Y=1 TO 2:READ C1$:C$(LEN(C$)+
   1)=C1$:NEXT Y:FOR Y=1 TO LEN(C$):POKE
   1535+Y,ASC(C$(Y,Y)):NEXT Y:RETURN
JO 1090 REM CHARACTER SET DATA
QF 1100 DATA ♥6▶▶>↑/♥┴┴→┴┴┴┘┘┘┘┘┘┘kkk0
   /?S@===▶▲▶<kkkkkkkk========/////+╳jUU▶
   ▶▶;╳╳UkKKK+++k=?????>?=?▶▶▶▶▶-U/0;n
SR 1110 DATA ╳╳nU/////////Um///////UUUUU[kk
   UUUUU5==[c//╳bZUU5KMS/+iZXkco+╳)UM▶3▶M
   5UUUUUU╳<+UUUUUU▶w▶♥♥♥▶▶┴┴┴┴┴┴▶▶♥♥♥
GH 1120 DATA PPPPPPPP┴┴→→♥♥♥x♦x♦◀┴←♥♥┴<◀
   ┴┴┴♥♥┴┴┴◀<┴♥♥┴0◀0┴♥♥♥♥┘◀┘┴♥♥♥♥┴<◀◀<┴♥♥♥
   ♥♥♥┘<?♥♥♥♥♥<▯▶♥┘▖▖??▶▶┘┘▖▖?▶▶♥@@P
TJ 1130 DATA ▯▯▶▶@@PP▯▯▯▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶WU
   ▶▶▶▶▶▶UU▶▶_WwW]u▶▶▶=WwUu▶SSUUUU▶SUUU
   UUu]UuWUUUUUUUUUUUWWW]SuwwWw]]Wwww
WI 1140 DATA W==▶▶?8(W▶▶▶;>▖♥UUUUUUUUUUUU
   UUUU♥♥fff<┴♥♥♥ck▶>6♥♥♥f<┴<f♥♥♥fff>┘x♥♥
   ♥♥♥♥▶▶♥♥┴<◀◀┴<♥┴┴┴┴┴┴┴┴┴♥◀x▯nf/♥/┴8x
MW 1150 DATA 8┴/♥+┴↑←↑┴+♥
NA 1160 REM SCREEN DATA
SV 1170 DATA ♥♥♥♥♥♥♥♥♥a♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥
   ♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥cgf♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥b♥♥♥
   ♥♥♥♥♥♥♥♥♥♥♥ce♥♥♥♥♥♥♥♥♥♥♥dggge♥♥♥♥♥♥♥♥♥♥♥
BL 1180 DATA ♥dge♥♥♥♥♥♥♥♥♥♥♥♥dgge♥♥♥♥♥♥♥♥dgg
   ggge♥♥de♥♥♥♥cgggfcf♥♥♥♥♥♥♥cgggge♥♥♥♥♥♥cg
   ggggggfcggf♥♥dgggggggf♥♥♥♥♥dgggggggf
QI 1190 DATA f♥♥cgggggggggggggecggggggggg
   e♥♥dggggggggggedgggggggggggggggggggggggg
   gggfcggggggggggggggggggggggggggggggg
NY 1200 DATA gggggggggggggggggggggggihgggigi
   hgggggggihggihggggggggghihggggggggnnkiMo
   nnnjhgggglonjlonjhiggggghMonnjhgggl
UH 1210 DATA ooonoooooonnjhiloooonooonnkih
   looooonnjhMoooooooooooooooooooooooooooooo
   oooooooooooooooooooooooooooOPooooooooo
FN 1220 DATA ooooooooooooooooooooooooooooooooo
   ooEFoooooooooooooooooooooooooooooooooooo
   ooooEFoNooooooooooooooooooUooooooooooooo
YS 1230 DATA ooooooooNoEFoMooooooooooooooooo
   QRoooooooooooooooooooooMoEJHKoooooooooooo
   oooQRSToooooooooooooooooooGHIFoooooooooo
QV 1240 DATA oooooooooooSToooooooooooooooooo
   ooEFooooooooooooooooooooQRoSToooooooorssrss
   rssrCDrsssrrrssrrsssrrsrssrrss
KA 1250 DATA zzz♥♥♥♥♥zzz♥♥♥♥♥zzz♥♥♥♥♥zzz♥
   ♥♥♥♥zzz♥♥♥♥♥♥
NK 1260 REM DLI AND VBI DATA
PK 1270 DATA H\HFePr▀\T)\▀┴P):▀LPh╳he&e5J
   ▀\T▀:Th╳he)H┐eZAPI█)▀r-8/▀K/ z/FLZLI▶P
   r)\┐L█▼▀┘-:/▀K/ z/N8/P←)┘▀8/FMZMI▶
WU 1280 DATA Pr)\┐M█/▀/-9/▀K/ z/Lbd1NiHrN
   P/H1Ni♥rN/1NMK/P┐8i(rN0/H1Ni♥rN/1N┴iPr
   PH1NrP╳:i♥rPHHJPi●:
QN 1290 REM COLOR DATA
ST 1300 DATA /♥.♥$FdH┗
TS 1310 REM PLAYER DATA
QH 1320 DATA 181,3,1
SR 1330 DATA ┼┘\▖→?▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶
   ▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶?→▖\┘
YV 1340 DATA ▶▶▶▶▶▶▶▶▶▶?→▖\┘┼┼┼┼┼┼┼┼┼
YP 1350 DATA ┴<<◀◀◀◀▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶◀◀◀◀<<┴
```

LISTING 2

Don't type the TYPO II Codes!

```
AT 10 REM GOIN' WEST, LISTING 2
XV 20 REM BY JOE BRZUSZEK
GL 30 REM (c) 1986, ANTIC PUBLISHING
WA 35 REM (CREATES LINES 210,1010,1030,11
   00-1150,1270,1280 AND 1330-1350)
CQ 40 REM (LINES 10-220 MAY BE USED WITH
   OTHER BASIC LOADERS IN THIS ISSUE.
IS 45 REM CHANGE LINE 70 AS NECESSARY.)
MG 50 DIM FN$(20),TEMP$(20),AR$(93)
HO 60 DPL=PEEK(10592):POKE 10592,255
QZ 70 FN$="D:GWLINES.LST":REM THIS IS THE
    NAME OF THE DISK FILE TO BE CREATED
YS 80 GRAPHICS 0:? "      ANTIC'S GENERIC
   BASIC LOADER"
CD 90 ? ,"BY CHARLES JACKSON"
PW 100 POKE 10592,DPL:TRAP 170
PO 110 ? :? :? "Creating ";FN$:? "...plea
   se stand by."
LQ 120 RESTORE :READ LN:LM=LN:DIM A$(LN):
   C=1
BK 130 AR$="":READ AR$
XW 140 FOR X=1 TO LEN(AR$) STEP 3:POKE 75
   2,255
DG 150 LM=LM-1:POSITION 10,10:? "(Countdo
   wn...T-";INT(LM/10);")      "
UY 160 A$(C,C)=CHR$(VAL(AR$(X,X+2))):C=C+
   1:NEXT X:GOTO 130
MZ 170 IF PEEK(195)=5 THEN ? :? :? "◩TOO
   MANY DATA LINES!":? "CANNOT CREATE FIL
   E!":END
CZ 180 IF C<LN+1 THEN ? :? "◩TOO FEW DATA
    LINES!":? "CANNOT CREATE FILE!":END
AL 200 OPEN #1,8,0,FN$
PP 210 POKE 766,1:? #1;A$;:POKE 766,0
AF 220 CLOSE #1:GRAPHICS 0:? " COMPLETED 
   "
HI 1000 DATA 1224
TK 1010 DATA 050049048032089061085083082
   0400650680820400341041730490021332071
   33209173048002133206024105003
XI 1020 DATA 133208144006165209105000133
   2091690001332031332041332051330651600
   08177206105040141185006160029
OQ 1030 DATA 177206105040141186006160041
   1772061050401411870061690071600381620
   06032092228096034041041155049
TN 1040 DATA 048049048032089061085083082
   0400650680820400341041041332091041332
   08104133207104133206169224133
PW 1050 DATA 204169000133203168162002177
   2031452062002082492302042302072022082
   42162002177208145206230208208
PI 1060 DATA 002230209230206208242230207
   2022082370960340410440650680820400670
   36041044088042050005305404115 5
HF 1070 DATA 049048051048032089061085083
   0820400650680820400341041041332071041
   33206104133209104133208169021
VQ 1080 DATA 133064162040160000177206145
   2081600401452082302082080022302092302
   06208002230207202208231198064
LI 1090 DATA 240013165208024105040133208
   1442162302092082120960340410440650680
   82040067036041044089049041058
KP 1100 DATA 067036061034034155049049048
   0480320680650840650320000541271270620
   28008000024024024031031024024
PF 1110 DATA 024003003003003003003003003
   1071071072391751912431921891891892552
   51251255060107107107107107107
QK 1120 DATA 107107189189189189189189189
   1891751751751751711701060850852552552
   55187170170085107235235235171
TL 1130 DATA 171171107189191191191191190
   1911891912552552552552551730851752391
   87238155049049049048032068065
JL 1140 DATA 084065032170170238085175175
   1751751751751751750851091751751751751
   75175085085085085085091107107
UV 1150 DATA 085085085085085181189189091
   0991751361700980900852450532532052530
   47171105090088107099111171170
XK 1160 DATA 169245205255051255205181085
   0850850850850850160600040850850850850
   85127119127000000000255255024
CL 1170 DATA 024024024024024255255000000
   0001550490490500480320680650840650322
   40240240240240240240024024
HN 1180 DATA 024031031000000000120096120
   0961260240300000000240601260240240240
   00000024024024126060024000000
VU 1190 DATA 024048126048024000000000000
   2401212601202400000000002406012612606
   0024000000000000000000012060063
DS 1200 DATA 000000000000000060252255000
   0030150150630632552550030030150150150
   63255255000192192240155049049
QQ 1210 DATA 051048032068065084065032252
   2522255255192192240240252252252255255
   255255255255255255255255255255
ID 1220 DATA 255255255215085255255255255
   2552552130852551270952151190872211171
   27127127223087119213117255253
FT 1230 DATA 253253245213085085255253253
   2132132130850851172210851170870850850
   85085085085085085085085085087
CE 1240 DATA 215215221125117119119087119
   0932212151191191191550490490520480320
   68065084065032215223223255255
ZR 1250 DATA 191186040247255255255187190
   1741280850850850850850850850850850850
   85085085085085000000102102
FD 1260 DATA 102060024000000000099107127
   0620540000000001020600240601020000000
   00102102102062012120000000000
LL 1270 DATA 000000000255255000024060126
   1260240600000240240240240240240240240
   00126120124110102006000008024
XV 1280 DATA 056120155049049053048032068
   0650840650320560240080000160240280300
   28024016000155049050055048032
IB 1290 DATA 068065084065032072138072198
   0642080171410102121690101410242081690
   04141026208104170104064166064
OC 1300 DATA 181202141010212141004212104
   1701040641690041330641650652080731600
   41162009173187006141188006032
JZ 1310 DATA 122006198204165204201255208
   0171690071332041600291620031731860061
   41188006032122006206184006208
HE 1320 DATA 030169003141184006198205165
   2052012551550490500560480320680650840
   65032208017169007133205160008
WV 1330 DATA 162006173185006141188006032
   1220060760982281772061050011452062080
   08200177206105000145206136177
LB 1340 DATA 206205188006208015056233040
   1452061760082001772062330001452061361
   77206024105080145208200177206
EQ 1350 DATA 145208144004105000145208200
   2002022082330960041550490510480480320
   68065084065032136000046000036
IO 1360 DATA 198100200026155049051051048
   0320680650840650320010030070150310631
   27255255255255255255255255
ND 1370 DATA 255255255255255255255255255
   2552552552552552552552552552552552552
   55255255255255255255255255255
DG 1380 DATA 127063031015007003155049051
   0520480320680650840650322552552552552
   55255127063031015007003001001
WH 1390 DATA 001001001001001001155049051
   0530480320680650840650320240600601261
   26126126255255255255255255255
WC 1400 DATA 255255255255255255255126126
   1261260600600024155
```

space-action spelling practice

SPELLBLAST

Article on page 59

LISTING 1

Don't type the TYPO II Codes!

```
YU 2 REM SPELL BLASTER
TR 3 REM BY MATTHEW RATCLIFF
FS 4 REM (c) 1986, ANTIC PUBLISHING
AT 10 GRAPHICS 23:DIM A$(410),B$(45):AD=A
   DR(A$):BD=ADR(B$)
ON 19 C0=0:C1=1:C2=2:C3=3:C4=4:C5=5:C6=6:
   C8=8:C9=9:C10=10:C15=15:C50=50:C255=25
   5:CGET=7:C127=127:C256=256
WN 100 DIM C$(354):CD=ADR(C$)
BS 110 GOSUB 5000:GOSUB 6000
CM 170 REM TEXT
ZH 180 C0=0:RESTORE 190:FOR I=C0 TO 21:RE
   AD X:POKE 1536+I,X:NEXT I:GOTO 1000
ON 190 DATA 169,0,133,212,162,8,70,186,14
   4,3,24,101,187,106,102,212,202,208,243
   ,133,213,96
GO 200 B=C0:FOR I=C1 TO C4
MP 210 A=INT(26*RND(C0))+C1:IF A=B THEN 2
   10
KB 220 B=A:CR(I)=ALPH(A):NEXT I
XK 230 A=INT(LW*RND(C0))+C1:B=INT(C4*RND(
   C0))+C1:C=ASC(WORD$(A,A))
IE 240 FOR I=C1 TO C4:IF CR(I)=C THEN 260

NR 250 NEXT I:CR(B)=C
QO 260 IF CR(C2)<>77 AND CR(C2)<>87 THEN
   GOTO 290
HR 270 A=CR(C1):IF A<>77 AND A<>87 THEN C
   R(C1)=CR(C2):CR(C2)=A:GOTO 290
XR 280 A=CR(C3):IF A<>77 AND A<>87 THEN C
   R(C3)=CR(C2):CR(C2)=A
ZQ 290 RETURN
HL 300 PASS=C0:POKE KEY,C255:DED=C0:COLOR
    C2:PLOT C50,44:PLOT 56,C50:PLOT C50,5
   6:PLOT 44,C50:COLOR C1
XJ 310 SPELL=C0:SEL=C0:DISP=35:FOR Y=45 T
   O 55:PLOT 45,Y:DRAWTO 55,Y:NEXT Y
CS 320 A=USR(CD,CR(C1),C1,47,44-DISP)
YH 330 A=USR(CD,CR(C2),C2,C50+DISP,48)
BQ 340 A=USR(CD,CR(C3),C3,46,52+DISP)
RU 350 A=USR(CD,CR(C4),C2,42-DISP,46)
VT 360 IF PEEK(KEY)<>C255 THEN SPELL=C1:G
   ET #C1,K:RETURN
IG 370 IF  NOT PEEK(TRG0) THEN PASS=C1:RE
   TURN
DZ 380 A=PEEK(STK0):SEL=(A=14)+C2*(A=7)+C
   3*(A=13)+4*(A=11)
IV 390 IF SEL THEN RETURN
ZI 400 POKE 50,DISP*C2+40
XB 410 DISP=DISP-C1:IF DISP>C5 THEN 320
CG 420 FOR W=C15 TO C0 STEP -0.15
EX 430 SOUND C0,PEEK(RD),C8,W:SETCOLOR C4
   ,W,C10
LM 440 NEXT W
CX 450 SETCOLOR C4,C0,C0:DED=C1:RETURN
NN 460 X=C8*(C10-LW):A=USR(AD,ADR(BLANK$)
   ,C,LW,C0,X):RETURN
PZ 500 COLOR C2:PLOT 97,C10:DRAWTO 97,95
OF 510 A=USR(AD,ADR("SCR"),C6,C3,C15,112)

VR 520 A=USR(AD,ADR("GES"),C5,C3,45,112)
LB 530 A=USR(AD,ADR("OK"),C10,C2,65,128)
UO 540 B$=STR$(GUES):A=USR(AD,BD,C5,LEN(B
   $),55,128)
FR 550 B$=STR$(OK):A=USR(AD,BD,C10,LEN(B$
   ),75,128)
KA 560 B$=STR$(SCR):I=C1:Y=30:B$(LEN(B$)+
   C1)=" "
BY 570 FOR X=112 TO 112+C8*(LEN(B$)-C1) S
   TEP C8
TO 580 A=USR(CD,ASC(B$(I,I)),C3,X,Y)
YB 590 I=I+C1:NEXT X
AI 595 RETURN
AX 600 FOR I=7 TO 87 STEP C8
BV 610 A=USR(AD,ADR("          "),C0,C6,I)
GA 620 NEXT I
ZI 630 RETURN
AP 640 A=USR(AD,ADR("          "),C0,C6,87,C0
   )
ZM 650 RETURN
HX 1000 TRG0=644:STK0=632:KEY=764:RD=5377
   0:TGES=C0:GUES=C0:SCR=C0:HSCR=C0:BLNK=
   ASC("-")
BL 1010 DIM CR(C4),ALPH(26),WORD$(C10),BL
   ANK$(C10):FOR I=C1 TO 26:ALPH(I)=I+64:
   NEXT I
PY 1020 RESTORE 20000:READ LINES:50=53760
   :OK=C0:TOK=C0:BGR=100
JP 1030 OPEN #C1,C4,C0,"K:"
OE 1040 GRAPHICS 23:SETCOLOR C0,C10,C10:S
   ETCOLOR C1,12,C8:SETCOLOR C2,C4,C10
RU 1050 B$="SPELLblast":SOUND C0,C0,C8,C1
   0:GOSUB 6000
SD 1060 FOR Y=C0 TO 80:A=USR(AD,BD,C5,LEN
   (B$),Y,C0):POKE 50,Y*2:NEXT Y
RD 1070 FOR Y=80 TO 20 STEP -C1:A=USR(AD,
   BD,C15,LEN(B$),Y,C0)
KV 1080 SOUND C0,Y,C10,C10:SOUND C1,Y+C4,
   C10,C10
MK 1090 NEXT Y
GH 1100 POKE KEY,C255
YE 1110 A=USR(AD,ADR("FROM ANTIC"),C10,C1
   0,C50,C0)
IK 1120 A=USR(AD,ADR("PRESS"),C15,C5,70,4
   0)
OE 1130 A=USR(AD,ADR("BUTTON"),C5,C6,80,4
   0)
BR 1140 SOUND C0,60,C10,C5:SOUND C1,64,C1
   0,C5
BU 1150 FOR I=C5 TO C15 STEP C5:C=PEEK(RD
   )/2:POKE KEY,C255
QG 1160 A=USR(AD,BD,I,LEN(B$),20,C0)
SO 1170 POKE 50,C:POKE 50+C2,C5*I
ZI 1180 IF (PEEK(KEY)<>C255 OR PEEK(TRG0)
   =C0) THEN 1200
NU 1190 NEXT I:GOTO 1150
DC 1200 SOUND C0,C0,C0,C0:SOUND C1,C0,C0,
   C0:GRAPHICS C0:SETCOLOR C2,C15,C0:POKE
    752,C1:GOSUB 6000
FT 1210 ? :? :GOSUB 1400
TY 1220 B$="     USE JOYSTICK TO PLAY":? :
   GOSUB 1400
FU 1230 B$="POINT HANDLE IN DIRECTION":?
   :GOSUB 1400
VO 1240 B$="OF LETTER THAT YOU THINK":GOS
   UB 1400
VU 1250 B$="WILL FIT IN THE WORD AT TOP":
   GOSUB 1400
VK 1260 B$="PRESS FIRE BUTTON TO PASS":?
   :GOSUB 1400
SJ 1270 B$="IF LETTERS WON'T FIT OR":GOSU
   B 1400
ED 1280 B$="ARE ALREADY CHOSEN":GOSUB 140
   0
WN 1290 B$="TO TRY SPELLING THE WORD, PRE
   SS":? :GOSUB 1400
TV 1300 B$="SPACE BAR (FOR MORE POINTS)":
   GOSUB 1400
ND 1310 B$="PRESS  Q  KEY TO QUIT THE GAM
   E":? :GOSUB 1400
OZ 1320 B$="AND SEE TOTALS":GOSUB 1400
NC 1330 B$="PRESS  BUTTON  TO START":? :?
```

continued on next page

```
   :GOSUB 1400
GX 1340 POKE KEY,C255
BW 1350 IF NOT (PEEK(KEY)<>C255 OR PEEK(TRG0)=C0) THEN 1350
RP 1360 GOTO 2800
PV 1400 A=38-LEN(B$):L=INT(A/C2)
YG 1410 FOR I=C1 TO L:? " ";:NEXT I
DD 1420 ? B$
AQ 1430 RETURN
GN 1500 TGES=TGES+GUES:GUES=C0:TOK=TOK+OK:OK=C0:TW=TW-C1:IF TW=C0 THEN GOTO 2300
NU 1510 LINE=INT(LINES*RND(C0))+BEGLIN:RESTORE LINE:BLANK$=WORD$
BP 1520 A=INT(C5*RND(C0))+C1
ZB 1530 FOR I=C1 TO A:READ WORD$:NEXT I:LW=LEN(WORD$)
BJ 1540 IF BLANK$=WORD$ THEN 1510
DD 1550 BLANK$="----------"
OH 1560 GRAPHICS 23:SETCOLOR C0,C4,C10:SETCOLOR C1,9,C10:SETCOLOR C2,12,C10:POKE 77,C0
AE 1570 C=C10:GOSUB 6000:GOSUB 460
XV 1580 GOSUB 500
WO 1590 GOSUB 200
GQ 1600 SOUND C0,C0,C8,C8:GOSUB 300
RH 1610 IF PASS THEN GOSUB 600:GOTO 1570
GJ 1620 IF NOT DED THEN 1750
ZC 1630 GRAPHICS 23:SETCOLOR C1,C4,C10
ML 1640 SETCOLOR C2,9,C10:SETCOLOR C3,12,C10:GOSUB 6000
UR 1650 BLANK$=WORD$:C=C5:GOSUB 460
AB 1660 C=C10*LW:SCR=SCR-C
BN 1670 A=USR(AD,ADR("LOSE"),C10,C4,40,48)
SW 1680 B$=STR$(C):A=USR(AD,BD,C5,LEN(B$),60,C8*(C10-LEN(B$)))
RH 1690 A=USR(AD,ADR("POINTS"),C15,C6,80,32)
HH 1700 FOR W=C15 TO C0 STEP -0.1
KF 1710 SOUND C0,C15*W,C6,W
SX 1720 SOUND C1,C15*W,12,W
LK 1730 NEXT W
PW 1740 GOTO 1500
EA 1750 IF NOT SPELL THEN 2030
IO 1760 GRAPHICS 23:SETCOLOR C1,C10,C10:SETCOLOR C2,14,C10:GOSUB 6000
HP 1770 IF K=ASC("Q") THEN 2300
ED 1780 POKE (KEY),C255:C=C15:GOSUB 460
QX 1790 CC=C5:FOR I=C10 TO 82 STEP C8:A=USR(AD,ADR("██████████"),CC,C10,I,C0):CC=CC+C1
BL 1792 IF CC>C15 THEN CC=C5
GU 1794 NEXT I
CL 1800 FOR I=C1 TO LW:A=ASC(BLANK$(I,I))
LO 1810 IF A<>BLNK THEN 1900
VI 1820 A=USR(AD,ADR("■"),CC,C1,C0,16*(I-C1)+X)
YF 1830 CC=CC+C1:IF CC>C255 THEN CC=C1
PX 1840 IF PEEK(KEY)=C255 THEN 1820
GT 1850 SOUND C0,C0,C0,C0:SOUND C1,C0,C0,C0:GET #C1,K:IF CHR$(K)<>WORD$(I,I) THEN 1980
PS 1860 SCR=SCR+C10:GUES=GUES+C1:BLANK$(I,I)=WORD$(I,I):OK=OK+C1
HL 1870 FOR J=80 TO C0 STEP -C2
VU 1880 A=USR(AD,ADR(WORD$)+I-C1,J+C5,C1,J,16*(I-C1)+X)
BW 1890 SOUND C0,J*2,C10,C5:SOUND C1,J*2+C4,C10,C5:NEXT J
IE 1900 SOUND C0,C0,C0,C0:SOUND C1,C0,C0,C0:NEXT I
QV 1910 FOR I=C8 TO 88 STEP C8:A=USR(AD,ADR("          "),C0,C10,I,C0):NEXT I
NJ 1920 GOSUB 500:B$="*CORRECT*"
OW 1930 FOR I=C1 TO LEN(B$)
YC 1940 A=USR(CD,ASC(B$(I,I)),C1,C8*I,C4*I+20)
FW 1950 NEXT I
PA 1960 A=USR(AD,ADR("PRESS"),C15,C5,70,C0):A=USR(AD,ADR("A KEY"),C10,C5,80,C0)
TO 1970 IF NOT (PEEK(KEY)<>C255 OR PEEK(TRG0)=C0) THEN 1970
OU 1971 IF PEEK(TRG0)=C0 THEN 1978
HR 1975 GET #C1,A:IF A=ASC("Q") THEN 2300
RP 1978 GOTO 1500
US 1980 FOR W=C15 TO C0 STEP -0.25
IX 1990 SOUND C0,PEEK(RD),C6,W
YU 2000 A=USR(AD,ADR("*WRONG*"),W,7,20,16)
KR 2010 NEXT W
SD 2020 GOTO 1560
JO 2030 IF NOT SEL THEN 3000
RK 2040 ON SEL GOTO 2050,2060,2070,2080
MO 2050 COLOR C3:PLOT C50,45:DRAWTO C50,51-DISP:GOTO 2090
AH 2060 COLOR C1:PLOT 55,C50:DRAWTO 51+DISP,C50:GOTO 2090
KD 2070 COLOR C2:PLOT C50,55:DRAWTO C50,51+DISP:GOTO 2090
LS 2080 COLOR C1:PLOT 45,C50:DRAWTO 49-DISP,C50
DI 2090 FOR W=C15 TO C0 STEP -C3
XZ 2100 A=INT(PEEK(RD)/1.25):SOUND C0,A,12,W:SOUND C1,A+C8,C8,W
KT 2110 NEXT W
BB 2120 B$=CHR$(CR(SEL)):C=C0:GUES=GUES+C1
RP 2130 FOR I=C1 TO LW
LB 2140 IF B$=BLANK$(I,I) THEN GOSUB 600:GOTO 1570
WO 2150 IF B$<>WORD$(I,I) THEN 2180
ZT 2160 BLANK$(I,I)=WORD$(I,I):SCR=SCR+C2:C=C+C1:OK=OK+C1
KT 2165 FOR A=40 TO 30 STEP -C2:SOUND C0,A,C10,C10:SOUND C1,A+C4,C10,C10:NEXT A
YP 2167 SOUND C0,C0,C0,C0:SOUND C1,C0,C0,C0:C=C10:GOSUB 460
KX 2170 IF BLANK$(C1,LW)=WORD$(C1,LW) THEN 2210
FQ 2180 NEXT I
LM 2190 IF C=C0 THEN SCR=SCR-C2
BW 2200 GOSUB 600:GOTO 1570
HQ 2210 GRAPHICS 23:SETCOLOR C1,C10,C10:SETCOLOR C2,14,C10:GOSUB 6000
UG 2220 C=C5:GOSUB 460
HQ 2230 SCR=SCR+C10:GOTO 1910
HP 2300 GRAPHICS 23:SETCOLOR C0,C4,C10:SETCOLOR C1,12,C8:SETCOLOR C2,9,C10:POKE KEY,C255:GOSUB 6000
EF 2305 TGES=TGES+GUES:TOK=TOK+OK
ZY 2310 A=USR(AD,ADR("SPELLblast"),C5,C10,C0,C0):C=C1:CC=C1
BL 2320 B$="Final Score ":B$(LEN(B$)+C1)=STR$(SCR):Y=C10:GOSUB 2700
PL 2330 B$="High Score ":IF SCR>HSCR THEN HSCR=SCR
RG 2340 B$(LEN(B$)+C1)=STR$(HSCR):Y=20:GOSUB 2700
SH 2350 B$="Total Correct LTRS":Y=30:GOSUB 2700
UG 2360 B$=STR$(TOK):Y=38:GOSUB 2700
CW 2370 B$="Total Guesses":Y=C50:GOSUB 2700
JK 2380 B$=STR$(TGES):Y=58:GOSUB 2700:IF TOK=C0 THEN TOK=C1
XD 2390 B$="AVG of ":AV=(INT(TGES*C10/TOK))/C10
OZ 2400 IF AV<BGR THEN BGR=AV
LO 2410 B$(LEN(B$)+C1)=STR$(AV):B$(LEN(B$)+C1)=" GES/LTR"
EJ 2420 Y=70:GOSUB 2700
MD 2430 B$="Best AVG is ":B$(LEN(B$)+C1)=STR$(BGR):Y=80:GOSUB 2700
FE 2440 POKE 50,PEEK(RD)
XP 2450 IF NOT (PEEK(KEY)<>C255 OR PEEK(TRG0)=C0) THEN 2320
EP 2460 SOUND C0,C0,C0,C0:GOTO 2800
ZZ 2700 CC=CC+C1:IF CC>C15 THEN CC=C1
CZ 2710 POKE 77,C0:A=USR(AD,ADR("SPELLblast"),CC,C10,C0,C0)
PL 2720 L=LEN(B$):S=C8*((21-L)/C2):I=C1
KS 2730 FOR X=S TO S+C8*(L-C1) STEP C8
DP 2740 A=USR(CD,ASC(B$(I,I)),C,X,Y):I=I+C1
GU 2750 SOUND C0,C5*CC+X,C10,C4:SOUND C1,C5*CC+X+C4,C10,C4
AT 2755 IF (PEEK(KEY)<>C255 OR PEEK(TRG0)=C0) THEN RETURN
MF 2760 NEXT X
BV 2770 C=INT(C3*RND(C0))+C1
BM 2780 RETURN
PC 2800 GRAPHICS C0:POKE 752,C1:SOUND C0,C0,C0,C0:SOUND C1,C0,C0,C0:POKE 710,C0:GOSUB 6000
```

```
TF 2810 TW=C10:SEL=C1:CONSOL=53279
GC 2820 TOPICS=C3
TN 2830 POKE 766,1:POSITION C2,C1:? "[illegible]=";TW;" WORDS/GAME BUTTON=BEGIN"
YB 2840 POSITION C8,C3:? "[illegible]=SUBJECT":POKE 766,0
RX 2850 POSITION C6,C5:? "1. ANIMALS, FISH & FOWL"
HG 2860 POSITION C6,C6:? "2. MUSICAL INSTRUMENTS"
XB 2870 POSITION C6,7:? "3. COMPUTER TERMINOLOGY"
EE 3000 POKE 766,1:POSITION C2,C1:? "[illegible]=";TW;" WORDS/GAME":POKE 766,0
OW 3010 A=PEEK(CONSOL):STKA=PEEK(STK0)
FJ 3020 POSITION C4,SEL+C4:? "*";:FOR I=C1 TO C10:NEXT I:POSITION C4,SEL+C4:? " ";
PQ 3030 IF  NOT (A=C3 OR STKA=11 OR STKA=7) THEN 3070
MU 3040 TW=TW+(4.5-STKA/2)*C5:IF TW>C50 THEN TW=C10
LO 3045 IF TW<C10 THEN TW=C50
IC 3050 FOR W=C15 TO C0 STEP -C1:SOUND C0,60,C10,W:NEXT W
OE 3060 GOTO 3000
AC 3070 IF  NOT (A=C5 OR STKA=14 OR STKA=13) THEN 3110
AN 3080 SEL=SEL+(27-2*STKA)*C1:IF SEL>TOPICS THEN SEL=C1
LZ 3085 IF SEL<1 THEN SEL=TOPICS
FM 3090 FOR W=C15 TO C0 STEP -C1:SOUND C0,40,C10,W:NEXT W
NO 3100 GOTO 3000
UJ 3110 IF  NOT (A=C6 OR PEEK(TRG0)=0) THEN 3000
NJ 3120 RESTORE 20000:FOR W=C15 TO C0 STEP -C1:SOUND C0,120,C10,W:NEXT W
PU 3130 FOR I=C1 TO SEL
PQ 3140 READ BEGLIN,LINES
FI 3150 NEXT I
VJ 3160 TGES=C0:GUES=C0:TOK=C0:OK=C0:SCR=C0
RP 3170 TW=TW-C1:GOTO 1500
DH 5000 A$(1,81)="[illegible]"
NN 5010 A$(82,163)="[illegible]"
NR 5020 A$(164,244)="[illegible]"
NH 5030 A$(245,326)="[illegible]"
ZT 5040 A$(327,410)="[illegible]"
PB 5060 C$(1,82)="[illegible]"
PE 5062 C$(83,164)="[illegible]"
HN 5064 C$(165,246)="[illegible]"
LQ 5066 C$(247,328)="[illegible]"
CQ 5068 C$(329,354)="[illegible]"
AY 5070 RETURN
TE 6000 POKE 77,0:POKE 16,112:POKE 53774,112:RETURN
JI 10000 DATA CAT,DOG,MOUSE,GIRAFFE,COW
OX 10001 DATA RAT,WHALE,AARDVARK,OWL,KITTEN
RN 10002 DATA BEAR,CUB,TIGER,PANTHER,FISH
KF 10003 DATA ANTELOPE,ANTEATER,GOAT,RAM,OX
NF 10004 DATA HORSE,DONKEY,MULE,LEOPARD,SNAKE
OW 10005 DATA COBRA,FOX,ZEBRA,MOCCASIN,SWAN
ED 10006 DATA MONKEY,CHIMPANZEE,GORILLA,MINK,CHINCHILLA
RQ 10007 DATA SKUNK,SQUIRREL,CHIPMUNK,WOODPECKER,LAMB
FA 10008 DATA BASS,SHARK,CATFISH,BLUEGILL,TUNA
IL 10009 DATA CHICKEN,ROOSTER,CARDINAL,BLUEJAY,SPARROW
JZ 10010 DATA THRUSH,QUAIL,YAK,PANDA,RACCOON
QB 10011 DATA BEAVER,OSTRICH,OTTER,RHINOCEROS,RABBIT
VR 10012 DATA DEER,MOOSE,WREN,DUCK,TURTLE
CI 10013 DATA COUGAR,SEAL,WALRUS,PYTHON,ELEPHANT
OB 10014 DATA PACHYDERM,JAGUAR,HYENA,KOALA,BAT
ET 10015 DATA KANGAROO,GRIZZLY,HAMSTER,BULLFROG,TOAD
IH 10016 DATA LIZARD,SALMON,TROUT,TUNA,MONGOOSE
NO 10017 DATA BUFFALO,BISON,CAMEL,STEER,WEASEL
HY 10020 DATA GUITAR,VIOLA,VIOLIN,UKELELE,PIANO
QO 10021 DATA FLUTE,SAXOPHONE,OBOE,TROMBONE,TRUMPET
OL 10022 DATA DRUM,BUGLE,TUBA,KETTLEDRUM,XYLOPHONE
EY 10023 DATA ZITHER,LYRE,HARP,LUTE,CLARINET
KO 10024 DATA PICCOLO,CELLO,ACCORDION,ALTHORN,BAGPIPE
CQ 10025 DATA BALALAIKA,BANJO,CASTANETS,CLAVICHORD,CONCERTINA
PQ 10027 DATA MANDOLIN,MARIMBA,ORGAN,HARMONICA,WOODWIND
YV 10030 DATA BYTE,MODEM,BOOLEAN,PROGRAM,BASIC
QF 10031 DATA ANTIC,BINARY,LOGO,EQUATION,GRAPHICS
SC 10032 DATA ARRAY,DOS,INPUT,ROUTINE,MONITOR
LO 10033 DATA MOUSE,PARALLEL,PRINTER,SOFTWARE,ROM
PR 10034 DATA JOYSTICK,FORTRAN,FILE,BUFFER,ASCII
PI 10035 DATA BOOT,SERIAL,OPUS,XMODEM,SPRITE
QG 10036 DATA MEMORY,COMMAND,STACK,FORMAT,PARITY
KU 10037 DATA PARSER,ENIAC,REGISTER,INTERRUPT,LOOP
YM 19990 REM BEGINNING LINE & TOTAL LINES
KW 19991 REM FOR EACH TOPIC START IN DATA HERE
AQ 20000 DATA 10000,18,10020,8,10030,8
```

LISTING 2

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HM 10 REM SPELLBLASTER, LISTING 2
IG 20 REM BY MATTHEW RATCLIFF
GL 30 REM (c) 1986, ANTIC PUBLISHING
RQ 35 REM (CREATES LINES 5000-5068)
CQ 40 REM (LINES 10-220 MAY BE USED WITH OTHER BASIC LOADERS IN THIS ISSUE.
IS 45 REM CHANGE LINE 70 AS NECESSARY.)
MG 50 DIM FN$(20),TEMP$(20),AR$(93)
HO 60 DPL=PEEK(10592):POKE 10592,255
VE 70 FN$="D:SLINE.LST":REM THIS IS THE NAME OF THE DISK FILE TO BE CREATED
YS 80 GRAPHICS 0:? "     ANTIC'S GENERIC BASIC LOADER"
CD 90 ? ,"BY CHARLES JACKSON"
PW 100 POKE 10592,DPL:TRAP 170
PO 110 ? :? :? "Creating ";FN$;? "...please stand by."
LQ 120 RESTORE :READ LN:LM=LN:DIM A$(LN):C=1
BK 130 AR$="":READ AR$
XW 140 FOR X=1 TO LEN(AR$) STEP 3:POKE 752,255
```

continued on next page

```
DG 150 LM=LM-1:POSITION 10,10:? "(Countdo
   wn...T-";INT(LM/10);")       "
UY 160 A$(C,C)=CHR$(VAL(AR$(X,X+2))):C=C+
   1:NEXT X:GOTO 130
MZ 170 IF PEEK(195)=5 THEN ? :? :? "TOO
   MANY DATA LINES!":? "CANNOT CREATE FIL
   E!":END
CZ 180 IF C<LN+1 THEN ? :? "TOO FEW DATA
    LINES!":? "CANNOT CREATE FILE!":END
AL 200 OPEN #1,8,0,FN$
PP 210 POKE 766,1:? #1;A$;:POKE 766,0
AF 220 CLOSE #1:GRAPHICS 0:? " COMPLETED 
   "
MC 1000 DATA 956
CC 1010 DATA 0530480480480320650360400490
   4405604904106103416520013322316900113 3
   222165084133229165085133227
SH 1020 DATA 1650861332281660871690102240
   0514400816902022400714400216904013323 9
   104240048170104133213104133
OS 1030 DATA 2122022400491041041332232022
   4000421041041332222022400351041041332 29
   202240022104133228104133227
OL 1040 DATA 2022400190341550530480490480
   3206503604005605000440490540510410610 34
   104104202208251024144011169
QZ 1050 DATA 2530761642461690001332271332
   2816522913323316523913323616900013323 0
   162008010038230006233144007
YT 1060 DATA 0241012361440022302302022082
   3913322916508813321616508913321716522 9
   024101216133216165230101217
XL 1070 DATA 1332171620011650872010091760
   0716203415505304805004803206503604004 9
   054052044050052052041061034
SD 1080 DATA 0020741760021620031652271012
   2824002507022810222720224000507022720 2
   208251230233024165227101216
FR 1090 DATA 1332161440022302171652161332
   2416521713322516900013322616200016900 0
   149218232165223149218010010
BC 1100 DATA 0100102321492180052192321492
   1816422617721216200013423420103415505 3
   048051048032065036040050052
MI 1110 DATA 0530440510500540410610341281
   4400404112719823417013323622409617601 3
   169064224032144002169224024
VC 1120 DATA 1012361332361690081332331690
   0013321516200801003821500623314400702 4
   101236144002230215202208239
CR 1130 DATA 1332140241732440021012151332
   1516000013223516000813223802414400302 4
   144169164235177214034155053
CD 1140 DATA 0480520480320650360400510500
   5504405204904804106103423023506923413 3
   232169000133237169004133231
VK 1150 DATA 1690001332331600020062320382
   3313620824916623318121816423714521623 0
   237198231208229024165216101
KU 1160 DATA 2391332161440022302171982382
   0819619822220800109623022602416522410 5
   004133224144002230225133216
BI 1170 DATA 1652251332170241441660960341
   5505304805404803206703604004904405605 0
   041061034104240010201004240
OR 1180 DATA 0131701041042022082511690221
   3318507606418510413319510420112814400 4
   041127198195170141022006224
LQ 1190 DATA 0961760151690642240321440021
   6922402410902200614102200610410414102 3
   006104104141024006201004144
DZ 1200 DATA 0050562330041762471332142010
   0024000716900403415505304805405003206 7
   036040056051044049054052041
FZ 1210 DATA 0610340562292141332140780240
   0607802400600621402410410414102500613 3
   186166087169010224003240008
BA 1220 DATA 1690202240052400021690401332
   0713318716508813320316508913320403200 0
   006024173024006101203133203
YQ 1230 DATA 1440022302040241652031012121
   3320316520410121313320417302200613318 7
   034155053048054052032067036
TD 1240 DATA 0400490540530440500520540410
   6103416900813318603200000616521213320 5
   173244002101213133206160000
YA 1250 DATA 1620081690001332091332081772
   0506919507210401007214400802417302300 6
   005208133208224001240008006
EW 1260 DATA 2080382090062080382092022082
   2810415207216000013221513221216621424 0
   088056038215202208250177203
CY 1270 DATA 0341550530480540540320670360
   4000500205504405105005604106103400521 5
   069215145203165215073255133
ZZ 1280 DATA 2152002001772030052150692151
   4520316621400620903821220220824916000 0
   024177203101221452031690 08
CK 1290 DATA 0562292141701322120702081022
   1220220824924000220813516000202417720 3
   101221452030241652081 01209
NR 1300 DATA 1600011452030241440091652090
   3415505304805405603206703604005105005 7
   044051053052041061034145203
WG 1310 DATA 2001652081452031041680241652
   0310120713320314400223020420019200820 8
   206096034155
```

new views for 3-D graphics

RESPONSE SURFACE MAPPING

Article on page 47

LISTING 1

Don't type the TYPO II Codes!

```
OS 1000 REM RSMAP
YS 1010 REM BY JIM PIERSON-PERRY
NR 1020 REM (c) 1986, ANTIC PUBLISHING
ZO 1025 REM DO NOT RENUMBER THIS PROGRAM
NM 1030 BREAK=1:IF PEEK(53279)=5 THEN BRE
   AK=0
CB 1040 DEG :GOTO 1240
QQ 1050 Z=SQR(X^2+Y^2)
AR 1060 RETURN
DT 1080 REM COMPUTE FUNCTION, PLOT MAP
JV 1090 FOR J=C0 TO 40:Y=Y-SY:X=X1-SX:B$(
   C1,C63)=BL$(C1,C63):IF J/C5=INT(J/C5)
   THEN B$(C1,C1)="*":B$(C63,C63)="*"
LD 1100 TRAP 2810:FOR I=C2 TO 62:X=X+SX
SB 1110 IF PEEK(CON)=OPTION THEN POP :POP
   :GOTO 2410
ZJ 1120 GOSUB 1050
HF 1130 IF Z<Z1 THEN K=C1:GOTO 1160
XG 1140 IF Z>Z2 THEN K=51:GOTO 1160
OT 1150 K=INT((Z-Z1)/SZ)+C1
ZA 1160 TRAP CLEAR:B$(I,I)=C$(K,K):NEXT I
FC 1165 POSITION C5,19:? "       *** Plotti
   ng ***     ":POKE 712,50
FG 1170 ? #C2;B$(C1,C63);BL$(C1,C4);C$(J+
   C6,J+C6):GOSUB 1210:POKE 712,160
TZ 1175 POSITION C5,19:? "       --- Thinki
   ng ---     "
```

```
GA 1180 NEXT J
BC 1190 RETURN
LG 1200 REM DISABLE BREAK KEY
HN 1210 POKE 77,0:IF BREAK THEN POKE 16,112:POKE 53774,112
AJ 1220 RETURN
IT 1230 REM START OF MAIN PROGRAM
GG 1240 DIM B$(63),BL$(67),C$(51),F$(80),C(51)
XS 1250 GRAPHICS 0:CR1=PEEK(709):CR2=PEEK(710):CR4=PEEK(712):POKE 709,172:POKE 710,160:POKE 712,160
JA 1255 POKE 559,( NOT (BREAK))*34
XO 1260 GOSUB 1210:C0=0:C1=1:C2=2:C3=3:C4=4:C5=5:C6=6:C10=10:C63=63:C67=67:CLEAR=40000:CON=53279
YC 1270 OPTION=C3:SELECT=C5:START=C6:PI=3.14159:E=2.71828179:BL$(C1)=" ":BL$(C67)=" ":BL$(C2)=BL$
BH 1280 C$="A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q,R,S,T,U,V,W,X,Y,Z"
EC 1290 POKE 752,C1
UO 1300 REM INTRO
CH 1310 ? "■":POSITION C6,C4:? "■■■■■■■■■■■■■■■■■■■■■■■■■■■■■"
KY 1320 POSITION C6,C5:? "■           RSMAP■           ■"
BP 1330 POSITION C6,C6:? "■ Response Surface Mapping ■"
IF 1340 POSITION C6,7:? "■■■■■■■■■■■■■■■■■■■■■■■■■■■■■":POSITION 19,10:? "by"
VI 1350 POSITION 11,12:? "Jim Pierson-Perry":POSITION 7,14:? "(c) 1986 Antic Publishing"
DX 1355 POSITION 10,16:? "ALL RIGHTS RESERVED":POKE 559,34
NQ 1360 FOR I=C1 TO 700:NEXT I
AC 1620 REM ENTER FUNCTION
FW 1630 ? "■":POSITION 9,C0:? " PLOT FUNCTION INPUT "
PL 1640 POSITION C3,C2:? "Type in the plotting function.  Use  valid BASIC syntax.  The function can"
OV 1650 POSITION C0,C4:? "use up to 2 independent variables:          X and/or Y."
ZC 1660 POSITION C3,7:? "Press BACKSPACE To Erase Typos"
LI 1670 POSITION C3,9:? "Press RETURN When Finished"
VX 1680 POSITION C0,13:? "Z=";:FOR I=C1 TO 78:? "_";:NEXT I
IW 1690 POKE 752,C0:POSITION C2,13:F$="":F$(C1,C2)="Z=":I=C3
PB 1700 CLOSE #C6:OPEN #C6,C4,C0,"K:":GOSUB 1210
FQ 1710 GET #C6,X:IF X=155 THEN CLOSE #C6:GOTO 1780
VP 1720 IF X=126 AND I>3 THEN ? CHR$(X);"_";CHR$(30);:I=I-C1:F$(I,I)=" ":GOTO 1710
WU 1730 IF I=81 THEN 1710
XE 1740 IF (X>39 AND X<44) OR (X>44 AND X<58) OR (X>64 AND X<91) OR X=94 THEN 1760
RK 1750 GOTO 1710
QS 1760 F$(I,I)=CHR$(X):? CHR$(X);:I=I+C1:GOTO 1710
KM 1770 REM INSTALL FUNCTION
UH 1780 POKE 559,( NOT (BREAK))*34:POKE 752,C1:? "■":? :? :? "1050 ";F$:?
EH 1790 ? "CONT":POSITION C0,C0:POKE 842,13:STOP
ED 1800 TRAP 2570:POKE 842,12:TRAP CLEAR
OP 1810 ? "■":POSITION 8,C0:? " PLOT PARAMETER INPUT ":POKE 559,34
DR 1820 REM GET PLOT AXES BOUNDARIES
WH 1830 POSITION C0,C2:? "ENTER VALUES FOR:"
HD 1840 POSITION C3,C4:? "X-axis minimum= ";:INPUT X1
DK 1850 POSITION C10,C5:? "maximum= ";:INPUT X2
MY 1860 IF X2<X1 THEN GOSUB 2660:POSITION C0,C4:? BL$(C1,38):? BL$(C1,38):GOTO 1840
CX 1870 POSITION C3,7:? "Y-axis minimum= ";:INPUT Y1
SP 1880 POSITION C10,8:? "maximum= ";:INPUT Y2
VQ 1890 IF Y2<Y1 THEN GOSUB 2660:POSITION C0,7:? BL$(C1,38):? BL$(C1,38):GOTO 1870
LT 1900 REM ESTIMATE RESPONSE RANGE OVER PLOT AXES
AH 1910 POSITION C0,10:? "PLEASE WAIT- ESTIMATING RESPONSE RANGE"
EX 1920 SX=(X2-X1)/C10:SY=(Y2-Y1)/C10:TRAP 2810
FM 1930 X=X1:Y=Y1
AF 1940 GOSUB 1050
PE 1950 ZLO=Z:ZHI=Z
AP 1960 FOR Y=Y1 TO Y2 STEP SY
YD 1970 FOR X=X1 TO X2 STEP SX
AR 1980 GOSUB 1050
ZV 1990 IF Z<ZLO THEN ZLO=Z
LT 2000 IF Z>ZHI THEN ZHI=Z
LC 2010 NEXT X
LQ 2020 NEXT Y
UT 2030 TRAP CLEAR
BE 2040 POSITION C0,C10:? BL$(C1,38):POSITION C0,C10:? "ESTIMATED RESPONSE (Z) RANGE:"
FC 2050 POSITION C3,11:? "Z minimum= ";ZLO
YS 2060 POSITION C5,12:? "maximum= ";ZHI
FF 2070 POSITION C0,20:? "Press START To Use These Values"
AF 2080 POSITION C0,21:? "Press OPTION To Enter Response Range"
OZ 2090 IF PEEK(CON)=START THEN Z1=ZLO:Z2=ZHI:GOTO 2170
BT 2100 IF PEEK(CON)=OPTION THEN 2120
RS 2110 GOTO 2090
VJ 2120 FOR I=C10 TO 21:POSITION C0,I:? BL$(C1,39):NEXT I
RC 2130 POSITION 8,C10:? "Z minimum= ";:INPUT Z1
PW 2140 POSITION C10,11:? "maximum= ";:INPUT Z2
QF 2150 IF Z2<Z1 THEN GOSUB 2660:POSITION C0,C10:? BL$(C1,38):? BL$(C1,38):GOTO 2130
UQ 2160 REM SET PRINTER - START MAPPING
NI 2170 ? "■":POSITION C5,C0:? " RESPONSE SURFACE MAP OUTPUT ":POKE CON,7
WU 2180 POSITION 9,C2:? "Prepare your printer:"
JL 2190 POSITION C10,C4:? "-Power on"
XC 2200 POSITION C10,C6:? "-Set paper at top of page":GOSUB 1210
LR 2210 POSITION C5,20:? "Press START to continue."
MB 2220 POSITION C5,21:? "Press OPTION to abort."
VH 2230 IF PEEK(CON)<>START THEN 2230
RM 2240 TRAP 2720:CLOSE #C2:OPEN #C2,C8,C0,"P:":TRAP CLEAR
XE 2250 POSITION C5,19:? "        *** Plotting ***        "
HU 2251 POSITION C5,20:? "                                "
IF 2260 SX=(X2-X1)/60:SY=(Y2-Y1)/40:SZ=(Z2-Z1)/50:C(C1)=Z1
IE 2270 FOR I=C2 TO 51:C(I)=C(I-C1)+SZ:NEXT I
NC 2280 TRAP 2720:? #C2:? #C2:I=40-LEN(F$)/C2:? #C2;BL$(C1,I);F$:? #C2:? #C2:TRAP CLEAR
KE 2290 ? #C2:? #C2:? #C2;BL$(C1,15);"X-axis range= ";X1;" to ";X2
BT 2300 ? #C2;BL$(C1,15);"Y-axis range= ";Y1;" to ";Y2
JM 2310 FOR I=C1 TO C4:? #C2;BL$(C1,C67);C$(I,I);"=";C(I):NEXT I
ZL 2320 B$(C1,C63)=BL$(C1,C63):FOR I=C2 TO 62 STEP C5:B$(I,I)="*":NEXT I
ZL 2330 ? #C2;B$(C1,62);BL$(C1,C5);C$(C5,C5);"=";C(C5)
IP 2340 REM
RX 2350 Y=Y2+SY
EI 2360 REM CALL THE MAPPING SUBROUTINE
HC 2370 POSITION C5,19:? "         --- Thinking ---       ":GOSUB 1090
AD 2380 B$(C1,C63)=BL$(C1,C63):FOR I=C2 TO 62 STEP C5:B$(I,I)="*":NEXT I
QJ 2390 ? #C2;B$(C1,62);BL$(C1,C5);C$(47,47);"=";C(47)
UD 2400 FOR I=48 TO 51:? #C2;BL$(C1,C67);C$(I,I);"=";C(I):NEXT I
PR 2410 ? #C2;CHR$(12):CLOSE #C2
```

continued on next page

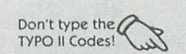
```
VA 2420 REM MAP COMPLETE - ALLOW RERUNS
XC 2430 ? "}":POSITION C5,C0:? " RESPONSE
    SURFACE MAP OUTPUT "
SI 2440 POSITION C5,C3:? "Response Map Ou
    tput Completed"
VQ 2450 POSITION 15,C6:? " OPTIONS ":POS
    ITION 15,7:? "=========="
LD 2460 POSITION C5,9:? " START  - Remap
    same function with":POSITION 15,10:? "
    new plot parameters"
ZK 2470 POSITION C5,12:? " OPTION - Exit
    program"
HA 2480 POSITION 7,15:? "Please Make Your
     Selection"
JF 2490 IF PEEK(CON)=OPTION THEN 2530
VA 2500 IF PEEK(CON)=START THEN 1810
TW 2510 GOTO 2490
IV 2520 REM ALL DONE - EXIT TO BASIC
YG 2530 GRAPHICS 0:POKE 709,CR1:POKE 710,
    CR2:POKE 712,CR4:POKE 82,C2:POKE 752,C
    0
VG 2550 ? "Program RSMAP done.":END
FF 2560 REM HANDLE BASIC SYNTAX ERRORS IN
     THE PLOT FUNCTION
DU 2570 ? "}":GOSUB 2860
YO 2580 POSITION 8,C5:? "There is a synta
    x error":POSITION 7,7:? "in your plott
    ing function."
AR 2590 POSITION 12,C10:? "BASIC Error #"
    ;PEEK(195)
IW 2600 POSITION C5,20:? "Press  START  T
    o Re-enter Function"
IY 2610 POSITION C5,21:? "Press  OPTION 
    To Exit Program"
YX 2620 IF PEEK(CON)=START THEN POKE 712,
    160:GOTO 1630
BZ 2630 IF PEEK(CON)=OPTION THEN POKE 712
    ,160:GOTO 2530
RS 2640 GOTO 2620
GW 2650 REM ERROR HANDLING CODE TO HANDLE
     UNREAL PLOT AXIS BOUNDS (MINIMUM GREA
    TER THAN MAXIMUM)
FG 2660 GOSUB 2860
ZK 2670 POSITION C0,20:? "The minimum mus
    t be less"
YG 2680 POSITION C0,21:? "than the maximu
    m value.  Try again.}}}"
AJ 2690 FOR I=C1 TO 300:NEXT I:POSITION C
    0,20:? BL$(C1,38):? BL$(C1,38)
VE 2700 POKE 712,160:RETURN
FU 2710 REM HANDLE PRINTER ERRORS
EW 2720 GOSUB 2860
QE 2730 POSITION 9,C10:? "Printer Error D
    etected":POSITION 11,12:? "BASIC Error
     #";PEEK(195)
AB 2740 POSITION 13,14:? "Please Correct"
CH 2750 IF PEEK(CON)=OPTION THEN POKE 712
    ,160:GOTO 2530
EL 2760 IF PEEK(CON)=START THEN 2780
UC 2770 GOTO 2750
WI 2780 FOR I=C10 TO 14:POSITION C0,I:? B
    L$(C1,38):NEXT I
RQ 2790 POKE 712,160:GOTO 2230
AD 2800 REM HANDLE ERRORS IN FUNCTION EVA
    LUATION
EV 2810 GOSUB 2860
XH 2820 ? "}":POSITION C5,C0:? " RESPONSE
    SURFACE MAP OUTPUT "
PT 2830 POSITION 7,C2:? "BASIC Error #";P
    EEK(195);" Occurred":POSITION C4,C3:?
    "During Plot Function Evaluation"
PI 2840 FOR I=C1 TO 500:NEXT I:POKE 712,1
    60:GOTO 2450
YG 2850 REM ERROR SOUND
HX 2860 POKE 712,50:SOUND C0,121,10,8:SOU
    ND C1,128,10,8:SOUND C2,8,C2,C2:FOR I=
    C1 TO 20:NEXT I
FA 2870 FOR I=C0 TO C2:SOUND I,C0,C0,C0:N
    EXT I:RETURN
```

lesson 9: subscripted variables

NEW OWNERS COLUMN

Article on page 54

LISTING 1




```
EM 10 REM NEW OWNER'S COLUMN PART 9
PR 11 REM BY DAVID PLOTKIN
GN 12 REM (c) 1986, ANTIC PUBLISHING
AI 20 REM LISTING 1: STUDENT TEST SCORES
JU 30 DIM SCORE(30):AVG=0:REM MAX. OF 30
   TEST SCORES
BV 40 STUDENT=1:REM INITIALIZE THE STUDEN
   T ID NUMBER
HK 50 READ SCORE:REM GET THE SCORE FROM T
   HE DATA STATEMENT
EL 60 IF SCORE=-1 THEN GOTO 100:REM A SCO
   RE OF -1 IS IMPOSSIBLE, SO WE USE -1 T
   O FLAG THE END OF DATA
EE 70 SCORE(STUDENT)=SCORE:REM PUT THE SC
   ORE INTO SINGLY SUBSCRIPTED VARIABLE "
   SCORE".
LG 80 STUDENT=STUDENT+1:GOTO 50:REM GO AR
   OUND FOR ANOTHER SCORE.
JQ 100 STUDENT=STUDENT-1:REM WE DID NOT U
   SE THE LAST STUDENT (SCORE=-1).
JP 110 GRAPHICS 0:POSITION 8,2:PRINT "STU
   DENT TEST SCORES":REM PRINT HEADING
PX 120 POSITION 8,3:PRINT "TOTAL STUDENTS
   : ";STUDENT
US 130 POSITION 3,4:PRINT "STUDENT ID #";
   :POSITION 25,4:PRINT "TEST SCORE";
TU 140 FOR LOOP=1 TO STUDENT:REM LOOP THR
   U THE NUMBER OF STUDENTS
ZZ 150 POSITION 9,LOOP+4:PRINT LOOP:POSIT
   ION 28,LOOP+4:PRINT SCORE(LOOP):AVG=AV
   G+SCORE(LOOP)
NE 160 NEXT LOOP
DS 170 POSITION 2,LOOP+4:PRINT "AVERAGE S
   CORE IS:";INT(AVG/STUDENT)
NC 180 HIGHSCORE=0:FOR LOOP=1 TO STUDENT:
   REM FIND THE HIGH SCORE
UE 190 IF SCORE(LOOP)>HIGHSCORE THEN HIGH
   SCORE=SCORE(LOOP):HIGHSTUDENT=LOOP
MT 200 NEXT LOOP
HJ 210 POSITION 2,LOOP+5:PRINT "HIGH SCOR
   E WAS ";HIGHSCORE;" BY STUDENT ";HIGHS
   TUDENT
NM 250 DATA 91,56,77,89,88,98,56,72,75,81
   ,78,93,66,-1
```

LISTING 2

```
EM 10 REM NEW OWNER'S COLUMN PART 9
PR 11 REM BY DAVID PLOTKIN
GN 12 REM (c) 1986, ANTIC PUBLISHING
CK 20 REM LISTING 2-STARSHIP SIMULATION
TH 30 DIM UNIVERSE(10,12):REM DIM THE ARRAY TO HOLD THE VALUES
DM 40 GRAPHICS 0:POKE 752,1:POSITION 3,3:PRINT "SETTING UP UNIVERSE. PLEASE WAIT"
GH 50 FOR OUTERLOOP=1 TO 10:REM STEP THRU THE FIRST SUBSCRIPT
YG 60 FOR INNERLOOP=1 TO 12:REM STEP THRU THE SECOND SUBSCRIPT
MK 70 NUMBERSHIPS=INT(RND(0)*4):REM USE RANDOM FUNCTION TO SET UP NUMBER OF SHIPS
GA 80 UNIVERSE(OUTERLOOP,INNERLOOP)=NUMBERSHIPS:REM PUT THE NUMBER IN THE ARRAY
HM 90 NEXT INNERLOOP:REM FINISH UP SECOND SUBSCRIPT
NE 100 NEXT OUTERLOOP:REM FINISH UP FIRST SUBSCRIPT
DC 110 PRINT CHR$(125):POSITION 9,0:PRINT "LONG RANGE SCAN";
LS 120 FOR LOOP=1 TO 10:POSITION LOOP*3,1:PRINT LOOP:NEXT LOOP:REM PRINT ROWS
AN 125 FOR LOOP=1 TO 32:POSITION LOOP,2:PRINT "-":NEXT LOOP
LR 130 FOR LOOP=1 TO 12:POSITION 0,LOOP+2:PRINT LOOP:NEXT LOOP:REM PRINT COLUMN PRINT UNIVERSE(10,12)
XL 135 FOR LOOP=1 TO 12:POSITION 2,LOOP+2:PRINT "|":NEXT LOOP
MW 140 FOR OUTERLOOP=1 TO 10
HO 150 FOR INNERLOOP=1 TO 12
SA 160 POSITION OUTERLOOP*3,INNERLOOP+2:PRINT UNIVERSE(OUTERLOOP,INNERLOOP)
PJ 170 NEXT INNERLOOP
XM 180 NEXT OUTERLOOP
JC 250 POKE 752,0
```

LISTING 3

```
BX 2 REM NEW OWNER'S COLUMN PART 9
JO 4 REM BY DAVID PLOTKIN
FU 6 REM (c) 1986, ANTIC PUBLISHING
UY 8 REM LISTING 3 - FRACTAL SHAPES
YT 10 COLOR 1
LK 20 DIM D(64,33),PR$(1),A$(1):BX=0:BY=0
ZQ 30 GRAPHICS 0:POSITION 2,5:PRINT "NUMBER OF LEVELS (3-6)":INPUT LE:IF LE>6 OR LE<3 THEN 30
NL 35 GOSUB 1200
BL 40 DS=2:FOR N=1 TO LE:DS=DS+2^(N-1):NEXT N
SK 50 MX=DS-1:MY=MX/2:PI=3.14159:RH=PI*30/180:VT=RH*1.2
SJ 60 FOR N=1 TO LE:L=10000/1.8^N
LC 70 PRINT "WORKING ON LEVEL ";N
DS 80 IB=MX/2^N:SK=IB*2
DC 90 GOSUB 150:REM ASSIGN HEIGHTS ALONG X IN ARRAY
VZ 100 GOSUB 220:REM ASSIGN HEIGHTS ALONG Y IN ARRAY
GJ 110 GOSUB 290:REM ASSIGN HEIGHTS ALONG DIAG. IN ARRAY
HT 120 NEXT N
HQ 130 GOTO 640:REM DRAW
PR 140 REM HEIGHTS ALONG X
PR 150 FOR YE=0 TO MX-1 STEP SK
AA 160 FOR XE=IB+YE TO MX STEP SK
UC 170 AX=XE-IB:AY=YE:GOSUB 370:D1=D:AX=XE+IB:GOSUB 370:D2=D
FW 180 D=(D1+D2)/2+RND(0)*L/2-L/4:AX=XE:AY=YE:GOSUB 420
PI 190 NEXT XE
QJ 200 NEXT YE:RETURN
QJ 210 REM HEIGHTS ALONG Y
TH 220 FOR XE=MX TO 1 STEP -SK
DQ 230 FOR YE=IB TO XE STEP SK
RI 240 AX=XE:AY=YE+IB:GOSUB 370:D1=D:AY=YE-IB:GOSUB 370:D2=D
FR 250 D=(D1+D2)/2+RND(0)*L/2-L/4:AX=XE:AY=YE:GOSUB 420
PN 260 NEXT YE
QN 270 NEXT XE:RETURN
FL 280 REM HEIGHTS ALONG DIAGONAL
PR 290 FOR XE=0 TO MX-1 STEP SK
BW 300 FOR YE=IB TO MX-XE STEP SK
MG 310 AX=XE+YE-IB:AY=YE-IB:GOSUB 370:D1=D
LB 320 AX=XE+YE+IB:AY=YE+IB:GOSUB 370:D2=D
QY 330 AX=XE+YE:AY=YE:D=(D1+D2)/2+RND(0)*L/2-L/4:GOSUB 420
PK 340 NEXT YE
QK 350 NEXT XE:RETURN
VN 360 REM RETRIEVE DATA FROM ARRAY
WB 370 IF AY>MY THEN 390
LX 380 BY=AY:BX=AX:GOTO 400
YC 390 BY=MX+1-AY:BX=MX-AX
IV 400 D=D(ABS(INT(BX)),BY):RETURN
MC 410 REM PUT DATA INTO ARRAY
SP 420 IF AY>MY THEN 440
PZ 430 BY=AY:BX=AX:GOTO 450
XT 440 BY=MX+1-AY:BX=MX-AX
ZK 450 D(BX,BY)=D:RETURN
ZO 470 RETURN
IH 630 REM DISPLAY HERE
TO 640 GOSUB 1110:REM SET UP SCREEN
PX 650 XS=0.04:YS=0.04:REM SCALING FACTORS
HA 660 FOR AX=0 TO MX:X0=-999:FOR AY=0 TO AX
EY 670 GOSUB 370:ZZ=D:YY=AY/MX*10000:XX=AX/MX*10000-YY/2
RY 680 GOSUB 940:NEXT AY:NEXT AX
EA 690 FOR AY=0 TO MX:X0=-999:FOR AX=AY TO MX
EL 700 GOSUB 370:ZZ=D:YY=AY/MX*10000:XX=AX/MX*10000-YY/2
RT 710 GOSUB 940:NEXT AX:NEXT AY
DG 720 FOR EX=0 TO MX:X0=-999:FOR EY=0 TO MX-EX
MR 730 AX=EX+EY:AY=EY:GOSUB 370:ZZ=D:YY=AY/MX*10000
KT 740 XX=AX/MX*10000-YY/2:GOSUB 940:NEXT EY:NEXT EX
LR 750 GOTO 1130
WM 760 REM ROTATE
ZQ 770 IF XX<>0 THEN 800
II 780 IF YY<=0 THEN RA=-PI/2:GOTO 820
UI 790 RA=PI/2:GOTO 820
MD 800 RA=ATN(YY/XX)
IX 810 IF XX<0 THEN RA=RA+PI
ZB 820 R1=RA+RH:RD=SQR(XX*XX+YY*YY)
KG 830 XX=RD*COS(R1):YY=RD*SIN(R1)
ZM 840 RETURN
TU 850 REM TILT DOWN
HF 855 IF ZZ<1E-30 THEN ZZ=0
WQ 860 RD=SQR(ZZ*ZZ+XX*XX)
MV 870 IF XX=0 THEN RA=PI/2:GOTO 900
NS 880 RA=ATN(ZZ/XX)
JN 890 IF XX<0 THEN RA=RA+PI
SB 900 R1=RA-VT
VN 910 XX=RD*COS(R1)+XX:ZZ=RD*SIN(R1)
ZJ 920 RETURN
RY 930 REM MOVE OR DRAWTO (XP,YP)
VP 940 GOSUB 470
OS 950 XX=XX*XS:YY=YY*YS:ZZ=ZZ*ZS
AB 960 GOSUB 770:REM ROTATE
CH 970 GOSUB 855:REM TILT UP
JG 980 IF X0=-999 THEN PR$="M"
MH 985 IF X0<>-999 THEN PR$="D"
XE 990 XP=INT(YY)+CX:YP=INT(ZZ)
XZ 1000 GOSUB 1030
AC 1010 RETURN
GG 1020 REM PLOT LINE HERE
FS 1030 XP=XP*0.625:YP=33.14-0.663*YP:POKE 77,0
TN 1040 IF PR$="M" THEN X8=XP:Y8=YP:X0=X
YV 1045 IF Y8>179 OR Y8<0 OR YP>179 OR YP<0 THEN RETURN
IT 1050 PLOT X8,Y8:DRAWTO XP,YP:X8=XP:Y8=YP:RETURN
```

continued on next page

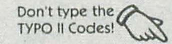
```
JX 1100 REM SET UP SCREEN
GW 1110 GRAPHICS 8:COLOR 1:POKE 710,0:RET
        URN
UP 1130 POKE 764,255:PRINT "PRESS RETURN
        TO CONTINUE":INPUT A$
QC 1140 GOTO 30
GY 1200 POSITION 7,12:PRINT "PRESS"
TH 1210 POSITION 2,13:PRINT "1 LOW MOUNTA
        INS":POSITION 2,14:PRINT "2 MED MOUNTA
        INS"
XT 1220 POSITION 2,15:PRINT "3 HIGH MOUNT
        AINS"
SI 1230 INPUT A$:IF A$<>"1" AND A$<>"2" A
        ND A$<>"3" THEN GRAPHICS 0:GOTO 1200
TN 1240 IF A$="1" THEN ZS=0.04
AG 1250 IF A$="2" THEN ZS=0.055
XW 1260 IF A$="3" THEN ZS=0.07
AY 1270 RETURN
```

game of the month

UNCLE HENRY'S NUCLEAR WASTE DUMP

Article on page 35

LISTING 1




```
ES 10 REM UNCLE HENRY'S NUCLEAR WASTE DUM
      P
WQ 20 REM BY JAMES HAGUE
GL 30 REM (c) 1986, ANTIC PUBLISHING
OK 40 BRK=1:IF PEEK(53279)=5 THEN BRK=0
FG 100 GOSUB 9000:REM MAIN INIT.
FX 110 GOSUB 8000:REM TITLE SCREEN
VJ 120 GOSUB 7000:REM GAME INIT.
CI 195 REM MAIN GAME LOOP
MA 200 GOSUB 6000:LAST1=A
PB 210 GOSUB 6000:IF LAST1=A THEN 210
GI 220 LAST2=A
UH 230 TIME=C6-SPEED:POSITION 18,C0:? #C6
       ;TIME
BO 240 GOSUB 6000:IF A=LAST1 OR A=LAST2 T
       HEN 240
JJ 250 LAST2=LAST1:LAST1=A:CHAR=A
FO 260 X=C9:Y=C3:PLOT X,Y
NY 270 POKE 20,C0
IA 275 REM DECIDE WHERE TO DUMP WASTE
ZU 280 IF PEEK(20)>=90 THEN 360
PZ 290 B=STICK(C0)
GB 300 IF B=11 AND X>C3 THEN A=X-C1:GOTO
       340
BB 310 IF B=C7 AND X<16 THEN A=X+C1:GOTO
       340
YA 320 IF NOT STRIG(C0) THEN 390
PI 330 GOTO 280
GS 340 COLOR C32:PLOT X,Y:COLOR CHAR:PLOT
       A,Y:X=A
BJ 350 SOUND C0,RND(C0)*C10+C10,C2,C6:FOR
       A=C1 TO C10:NEXT A:SOUND C0,C0,C0,C0:
       GOTO 280
GN 360 TIME=TIME-C1:POSITION 18,C0:? #C6;
       TIME
FJ 370 IF TIME>C0 THEN 270
QX 380 SOUND C0,30,12,C15:FOR A=C1 TO 200
       :NEXT A:SOUND C0,C0,C0,C0
KD 385 REM HANDLE FALLING WASTE
TI 390 A=Y+C1:COLOR C32:PLOT X,Y:COLOR CH
       AR:PLOT X,A:Y=A
CY 400 LOCATE X,Y+C1,A:IF A<>C32 THEN 430
QT 410 SOUND C0,Y+200,C10,C8:SOUND C1,Y+2
       00,C10,C8:A=C2:GOSUB 6100
QC 420 GOTO 390
GX 430 FOR A=C10 TO C15:SOUND C0,50,C8,A:
       SOUND C1,150,C8,A:NEXT A
HC 440 FOR A=C15 TO C0 STEP -C1:SOUND C0,
       40,C8,A:SOUND C1,125,C8,A:NEXT A
FB 450 LOCATE X-C1,Y+C1,A:IF A=C32 THEN A
       =-C1:GOTO 550
NA 460 LOCATE X+C1,Y+C1,A:IF A=C32 THEN A
       =C1:GOTO 550
SL 470 LOCATE X-C1,Y,A:LOCATE X+C1,Y,B:LO
       CATE X,Y+C1,C:IF A=CHAR OR B=CHAR OR C
       =CHAR THEN 700:REM LOSE!
RG 480 SCORE=SCORE+C10:POSITION C7,C0:? #
       C6;SCORE
LQ 490 IF SCORE>HIGH THEN HIGH=SCORE
UX 500 IF Y=C7 THEN 1000:REM WIN!
IH 510 IF PEEK(633)=13 THEN COLOR 78:PLOT
       C1,C6:COLOR 90:PLOT 18,C6
NF 520 GOTO 230
TC 550 A=X+A:COLOR C32:PLOT X,Y:COLOR CHA
       R:PLOT A,Y:X=A
ZM 560 A=C5:GOSUB 6100:GOTO 390
SX 695 REM END OF THE WORLD
MB 700 POSITION C7,C3:? #C6;"OH NO!"
SN 710 FOR A=C1 TO C3
TD 720 FOR B=48 TO C0 STEP -C1:SOUND C0,B
       ,C8,C15:SOUND C0,B*C3,C8,C15:POKE 712,
       B:NEXT B:NEXT A
SG 730 SOUND C0,50,C8,C15:GRAPHICS 18:A=U
       SR(ADR(BOOM$))
HR 740 GRAPHICS C0:POKE 559,C0:POKE 710,C
       0:POKE 752,C1:SOUND C0,C0,C0,C0:SOUND
       C1,C0,C0,C0
XG 750 POSITION C4,12:? CHR$(34);"Good he
       lp is so hard to find.";CHR$(34):POSIT
       ION 22,14:? "-Uncle Henry"
KF 760 COLOR 14:PLOT C0,23:DRAWTO 39,23
PA 770 COLOR 160:FOR A=C0 TO C2:PLOT 28,2
       1+A:DRAWTO 30,21+A:NEXT A:PLOT 30,23
TY 780 POSITION 28,20:? "RIP":POSITION 28
       ,19:? "◢■◣"
NQ 790 COLOR 124:PLOT 29,18:COLOR 19:PLOT
        29,17
CL 800 POKE 559,34:A=240:GOSUB 6100
MA 810 GOTO 110
IN 900 IF BRK THEN POKE 16,112:POKE 53774
       ,112:REM DEBUG
ZH 910 RETURN
BY 995 REM YOU WIN!
UV 1000 POSITION C7,C3:? #C6;"YAHOO!"
RU 1010 FOR A=200 TO C10 STEP -C10:FOR B=
        C15 TO C10 STEP -C1:SOUND C0,A,C10,B:S
        OUND C0,A+25,C10,B:NEXT B:NEXT A
DA 1015 SOUND C0,243,C10,C10:SOUND C1,193
        ,C10,C10:SOUND C2,162,C10,C10
PQ 1020 GRAPHICS 18:POKE 708,C0
PJ 1030 POSITION C1,C5:? #C6;"1000 BONUS
        POINTS!":A=USR(ADR(RAINBOW$))
SP 1035 FOR A=C0 TO C2:SOUND A,C0,C0,C0:N
        EXT A
XL 1040 SCORE=SCORE+1000:IF SCORE>HIGH TH
        EN HIGH=SCORE
```

```
WW 1050 GRAPHICS C0:POKE 559,C0:POKE 710,
   C0:POKE 752,C1
ZV 1060 POSITION C2,C10:? CHR$(34);"Not b
   ad, but why are you glowing?";CHR$(34)
XK 1070 POSITION 24,12:? "-Uncle Henry"
XG 1080 POKE 559,34:A=240:GOSUB 6100
OF 1090 GOTO 110
NY 5995 REM RETURN RANDOM WASTE CHAR (A)
EQ 6000 A=INT(RND(C0)*C3)
GW 6010 IF  NOT A THEN A=38:GOTO 6040
TO 6020 IF A=C1 THEN A=167:GOTO 6040
GD 6030 A=136
FW 6040 COLOR A
ZD 6050 GOSUB 900
AW 6060 RETURN
ZY 6095 REM WAIT 1-255 JIFFIES (A)
TW 6100 GOSUB 900:POKE 20,C0
VH 6110 IF PEEK(20)<A THEN 6110
AM 6120 RETURN
DI 6995 REM GAME INIT.
MJ 7000 GRAPHICS C0:POKE 559,C0:POKE 710,
   C0:POKE 752,C1:SCORE=C0
AG 7010 POSITION C5,C10:? CHR$(34);"I hop
   e you've got insurance.";CHR$(34)
VV 7020 POSITION 22,12:? "-Uncle Henry"
ZJ 7030 POKE 559,34:A=180:GOSUB 6100
GU 7040 GRAPHICS 17:POKE 559,C0:POKE 756,
   CHSET/C256
DU 7050 POKE 708,26:POKE 709,38:POKE 710,
   202:POKE 711,134:POKE 712,C0
HV 7060 POSITION C1,C0:? #C6;"SCORE:0
   SPD:";SPEED;" 0"
QQ 7070 COLOR C5:FOR A=C0 TO C2:PLOT A,C7
   :DRAWTO A,23:PLOT 17+A,C7:DRAWTO 17+A,
   23:NEXT A
TG 7080 PLOT C3,22:DRAWTO 16,22:PLOT C3,2
   3:DRAWTO 16,23
KM 7090 COLOR C3:PLOT C2,C7:COLOR C4:PLOT
    17,C7
VQ 7100 GOSUB 6000:PLOT C3,21:B=A
ZY 7110 FOR C=C4 TO 16
VS 7120 GOSUB 6000:IF A=B THEN 7120
JU 7130 PLOT C,21:B=A:NEXT C
GD 7140 POKE 559,34:A=30:GOSUB 6100
UI 7150 POSITION C6,C3:? #C6;"READY..."
XK 7160 A=60:GOSUB 6100
FJ 7170 POSITION C6,C3:? #C6;"        "
XE 7180 POSITION C7,C4:? #C6;"SET..."
AN 7190 GOSUB 6100
WL 7200 POSITION C7,C4:? #C6;"      "
OZ 7210 POSITION C2,C5:? #C6;"DUMP THAT W
   ASTE!"
OJ 7220 FOR A=C1 TO C4:FOR B=C10 TO C0 ST
   EP -C1:SOUND C0,C15,C10,B:SOUND C1,31,
   C10,B:SOUND C2,64,C10,B:NEXT B:NEXT A
FE 7230 COLOR 32:PLOT C2,C5:DRAWTO 17,C5
AV 7240 RETURN
PK 7995 REM TITLE SCREEN
FF 8000 POKE 559,C0
IQ 8010 POKE 708,134:POKE 709,C10:POKE 71
   0,C0:POKE 711,38:POKE 712,C0
KN 8020 POKE 560,C0:POKE 561,C6
NK 8030 FOR A=C0 TO C3:POKE TITLE+11+A,16
   :POKE TITLE+22+A,16:NEXT A
XZ 8040 A$=STR$(SCORE):B=LEN(A$)
JE 8050 FOR A=C1 TO B:POKE 14-B+TITLE+A,A
   SC(A$(A,A))-C32:NEXT A
QG 8060 A$=STR$(HIGH):B=LEN(A$)
LJ 8070 FOR A=C1 TO B:POKE 25-B+TITLE+A,A
   SC(A$(A,A))-C32:NEXT A
RW 8080 POKE TITLE+34,SPEED+16
ZM 8090 POKE 559,34
AH 8100 IF PEEK(53279)=C6 OR  NOT STRIG(C
   0) THEN RETURN
YV 8110 FOR A=C1 TO 25:NEXT A
XL 8120 IF PEEK(53279)<>C5 THEN 8100
QN 8130 SPEED=SPEED+C1:IF SPEED>C5 THEN S
   PEED=C1
RM 8140 POKE TITLE+34,SPEED+16
FZ 8150 IF PEEK(53279)=C5 THEN 8150
VB 8160 GOTO 8090
IJ 8995 REM MAIN INIT.
VQ 9000 RESTORE 9500:READ C0,C1,C2,C3,C4,
   C5,C6,C7,C8,C9,C10,C15,C32,C256,C512
ON 9010 GRAPHICS 18:POKE 708,C0:POKE 712,
   56:POSITION C3,C5:? #C6;"OH NO! IT'S..
   ."
FH 9020 SPEED=C3:GOSUB 900
CB 9030 DIM MEM$(1324),BOOM$(18),RAINBOW$
   (17),A$(40)
KJ 9040 BOOM$="h[illegible]"
BB 9050 RAINBOW$="h[illegible]"
AR 9060 MEM$="■":MEM$(1324)="■":MEM$(C2)=
   MEM$
DZ 9070 A=ADR(MEM$):CHSET=C512-(A-INT(A/C
   512)*C512)+A:TITLE=CHSET+C512
ZN 9080 POKE 203,C0:POKE 204,CHSET/C256
DV 9085 A=USR(ADR("h[illegible]
   [illegible]"))
BX 9090 FOR A=C0 TO 47:READ B:POKE CHSET+
   24+A,B:NEXT A
GK 9100 FOR A=C0 TO 29:READ B:POKE 1536+A
   ,B:NEXT A:POKE 1540,C0:POKE 1541,TITLE
   /C256
IA 9110 READ A:IF A=-1 THEN RETURN
GT 9120 READ A$
NV 9130 FOR B=C1 TO LEN(A$):C=ASC(A$(B,B)
   )
ZG 9140 IF C<96 THEN C=C-C32
IA 9150 POKE TITLE+A+B-C1,C:NEXT B
RZ 9160 GOTO 9110
LE 9495 REM CONSTANTS
VP 9500 DATA 0,1,2,3,4,5,6,7,8,9,10,15,32
   ,256,512
HW 9525 REM CHARACTER DATA
MW 9530 DATA 248,254,255,255,255,255,255,
   255
HU 9540 DATA 31,127,255,255,255,255,255,2
   55
NJ 9545 DATA 255,255,255,255,255,255,255,
   255
LC 9550 DATA 0,254,124,56,16,56,124,254
WH 9560 DATA 0,124,254,254,238,254,254,12
   4
TB 9570 DATA 0,254,130,186,170,186,130,25
   4
LL 9575 REM TITLE DISPLAY LIST
ME 9580 DATA 112,112,112,66,0,0,112,112,1
   12,6,7,112,2,112,112,112,6,6,112,112,1
   12,2,7,112,112,112,2,65,0,6
UA 9585 REM TITLE TEXT
UA 9590 DATA 5,SCORE:XXXX  HIGH:XXXX  SPE
   ED:
AH 9600 DATA 43,UNCLE  HENRY'S
LG 9610 DATA 61,nuclear waste dump
ZR 9620 DATA 89,OVER 50 BILLION SERVED
EO 9630 DATA 123,START TO BEGIN
BU 9640 DATA 142,SELECT FOR SPEED
PM 9650 DATA 161,another game from the de
   mented mind of
OZ 9660 DATA 204,James  hague
AU 9670 DATA 227,(c) 1986 Antic Publishin
   g
FW 9680 DATA -1
```

LISTING 2

```
NX 10 REM UNCLE HENRY'S NUCLEAR WASTE DUM
   P, LISTING 2
WQ 20 REM BY JAMES HAGUE
FW 30 REM (c) 1985, ANTIC PUBLISHING
BA 35 REM (CREATES LINES 9040, 9050 AND 9
   085 FOR LISTING 1)
CQ 40 REM (LINES 10-220 MAY BE USED WITH
   OTHER BASIC LOADERS IN THIS ISSUE.
IS 45 REM CHANGE LINE 70 AS NECESSARY.)
MG 50 DIM FN$(20),TEMP$(20),AR$(93)
HO 60 DPL=PEEK(10592):POKE 10592,255
WO 70 FN$="D:LINES.LST":REM THIS IS THE N
   AME OF THE DISK FILE TO BE CREATED
YS 80 GRAPHICS 0:? "      ANTIC'S GENERIC
   BASIC LOADER"
CD 90 ? ,"BY CHARLES JACKSON"
PW 100 POKE 10592,DPL:TRAP 170
PO 110 ? :? :? "Creating ";FN$:? "...plea
   se stand by."
LQ 120 RESTORE :READ LN:LM=LN:DIM A$(LN):
   C=1
BK 130 AR$="":READ AR$
XW 140 FOR X=1 TO LEN(AR$) STEP 3:POKE 75
   2,255
DG 150 LM=LM-1:POSITION 10,10:? "(Countdo
   wn...T-";INT(LM/10);")   "
UY 160 A$(C,C)=CHR$(VAL(AR$(X,X+2))):C=C+
```

continued on next page

```
   1:NEXT X:GOTO 130
MZ 170 IF PEEK(195)=5 THEN ? :? :? "◩TOO
   MANY DATA LINES!":? "CANNOT CREATE FIL
   E!":END
CZ 180 IF C<LN+1 THEN ? :? "◩TOO FEW DATA
    LINES!":? "CANNOT CREATE FILE!":END
AL 200 OPEN #1,8,0,FN$
PP 210 POKE 766,1:? #1;A$;:POKE 766,0
AF 220 CLOSE #1:GRAPHICS 0:? " COMPLETED 
   "
FW 1000 DATA 114
HX 1010 DATA 0570480520480320660790790770
   36061034104169000133020173010210141026
   208165020201120144244096034
WQ 1020 DATA 1550570480530480320820650730
   78066079087036061034104169001133020140
   010212140026208200165020208
WN 1030 DATA 2450960341550570480560530320
   65061085083082040065068082040034104169
   000133205168169224133206177
RH 1040 DATA 2051452032002082492302042302
   06165206201226208239096034041041155
```

moving real things with your Atari

STEPPER MOTOR ROBOT-CONTROLLER

Article on page 62

LISTING 1

Don't type the TYPO II Codes!

```
ZJ 10 REM STEPPER MOTOR DRIVER PROGRAM
IU 20 REM BY SCOTT KILBOURNE, BILL HALL
         AND JON HOLCOMB
GL 30 REM (c) 1986, ANTIC PUBLISHING
OK 40 BRK=1:IF PEEK(53279)=5 THEN BRK=0
NS 50 GOTO 150
OU 60 REM GET ANSWER ROUTINE
ZW 70 TRAP 350:CLOSE #1:OPEN #1,4,0,"K:":
   GOSUB 1730:GET #1,ANS:CLOSE #1
MU 80 IF ANS<48 OR ANS>57 THEN 70
ZZ 90 RETURN
VC 100 REM REFRESH CURRENT SETTINGS
YG 110 POKE 752,1:POSITION 0,0:? "    ◩□□
   □□□□□□□◪    TOP-----";TP:? "    □DISPLA
   Y □    BOTTOM--";L
TI 120 ? "    □SETTINGS□     PRESENT-";P:?
    "    ◪□□□□□□□□□□□◩     SPEED---";R;
ZD 130 RETURN
JG 140 REM INITIALIZE ALL VARIABLES
PF 150 A=5:REM STEP 1 PHASE
SG 160 B=6:REM STEP 2 PHASES
AV 170 C=10:REM STEP 3 PHASES
UZ 180 D=9:REM STEP 4 PHASES
WZ 190 E=7:REM HALFSTEP BETWEEN PHASES 1
   AND 2
IN 200 F=14:REM HALFSTEP PHASES 2 AND 3
KK 210 G=11:REM HALFSTEP PHASES 3 AND 4
IH 220 H=13:REM HALFSTEP PHASES 4 AND 1
BJ 230 PORTA=54016:REM JOYSTICK PORT 1
FK 240 PACTL=54018:REM PORTA CONTROLLER
YK 250 CONSOL=53279:REM CONSOLE KEYS
JD 260 TXTROW=656:TXTCOL=657
QP 270 DIM BL$(120):BL$=" ":BL$(120)=BL$:
   BL$(2)=BL$
GL 280 DELAY=5:REM DELAY VALUE
TI 290 TP=100:REM TOP VALUE TO MOVE TO
WI 300 L=100:REM LOWEST VALUE TO MOVE TO
TX 310 POKE PACTL,56:POKE PORTA,255:POKE
   PACTL,60
OF 320 P=L
UY 330 GOSUB 1540
QE 340 REM MAIN PROGRAM
QB 350 REM MASTER MENU
WL 360 DELAY=50:R=50:GRAPHICS 1:POKE 710,
   0:GOSUB 110:GOSUB 1730
WT 370 POSITION 0,0:? #6;"master menu"
KH 380 ? #6
LM 390 POKE PORTA,255:REM TURNS OFF ALL P
   HASES
SO 400 ? #6;"1-SET TOP OF TRAVEL"
UN 410 ? #6;"2-SET BOTTOM "
UD 420 ? #6;"3-PROGRAMMED MOVE"
JW 430 ? #6;"4-SET SPEED"
HI 440 ? #6;"5-GO UP FAST"
MG 450 ? #6;"6-GO DOWN FAST"
JC 460 ? #6;"7-MOVE TO TOP"
ZA 470 ? #6;"8-MOVE TO BOTTOM"
NB 480 ? #6;"□□□□□□□□□□□□□□□□□□□□"
EG 490 POSITION 0,11:? #6;BL$
TB 500 POSITION 0,12:? #6;" your choice";
   CHR$(159)
YZ 510 GOSUB 70:REM GET ANSWER
GN 520 TRAP 350:IF ANS<49 OR ANS>56 THEN
   350
IE 530 POSITION 1,ANS-47:? #6;CHR$(30)
YK 540 S=ANS-48:ON S GOSUB 560,660,750,93
   0,1020,1120,1290,1400
PN 550 GOTO 370
VP 560 POSITION 0,11:? #6;"start=move sta
   ge up":? #6;"stage continues up  as yo
   u hold start."
YK 570 IF PEEK(CONSOL)<>6 THEN 570
ZU 580 ? #6:? #6;"select=menu";
UP 590 POKE PACTL,56:POKE PORTA,255:POKE
   PACTL,60
KU 600 POKE PORTA,D:POKE CONSOL,7
WT 610 POKE PORTA,C:POKE PORTA,B:POKE POR
   TA,A:P=P+1
SQ 620 POKE TXTROW,0:POKE TXTCOL,28:? P;"
    ":POKE TXTROW,2:POKE TXTCOL,28:? P;"
   ";
XX 630 IF PEEK(CONSOL)=6 THEN 600
BT 640 IF PEEK(CONSOL)=5 THEN 370
YN 650 TP=P:GOTO 630
YF 660 POSITION 0,11:? #6;"start=move sta
   ge dn":? #6;"stage continues downas yo
   u hold start"
ZO 670 IF PEEK(CONSOL)<>6 THEN 670
OH 680 ? #6:? #6;"select=menu"
JQ 690 POKE PORTA,A:POKE CONSOL,7
FR 700 POKE PORTA,B:POKE PORTA,C:POKE POR
   TA,D:P=P-1
TG 710 POKE TXTROW,1:POKE TXTCOL,28:? P;"
    ":POKE TXTROW,2:POKE TXTCOL,28:? P;"
   ";
HX 720 IF PEEK(CONSOL)=6 THEN 690
DN 730 IF PEEK(CONSOL)=5 THEN RETURN
DQ 740 L=P:GOTO 720
ST 750 POSITION 0,12:? #6;"start=begin mo
   ve     ":REM MOVE BOTTOM TO TOP
ZM 760 IF PEEK(CONSOL)<>6 THEN 760
ER 770 ? #6:? #6;"press SELECT to quit"
QB 780 IF P=TP THEN 910
YI 790 POKE PORTA,H:GOSUB 1510
VF 800 POKE PORTA,D:GOSUB 1510
XD 810 POKE PORTA,G:GOSUB 1510
UT 820 POKE PORTA,C:GOSUB 1510
VU 830 IF PEEK(CONSOL)=5 THEN 920:REM LEA
   VE SUBROUTINE
WT 840 POKE PORTA,F:GOSUB 1510
UJ 850 POKE PORTA,B:GOSUB 1510
WH 860 POKE PORTA,E:GOSUB 1510
```

```
TX 870 POKE PORTA,A:GOSUB 1510
NM 880 P=P+1+((P>TP)*-2)
SU 890 POKE TXTROW,2:POKE TXTCOL,28:? P;"
    ";:POKE CONSOL,7
RH 900 IF P<>TP THEN 780
NX 910 GOSUB 1750:POSITION 0,15:? #6;"Mov
   e done!                   ":FOR PAUSE=1 TO
    150:NEXT PAUSE:GOSUB 1730
ZJ 920 RETURN
JL 930 POSITION 0,12:? #6;"Choose speed
      ":REM SET SPEED OF TRAVEL
JS 940 ? #6:? #6;"10=slow  99=fast"
VS 950 GOSUB 70
NR 960 R=ANS-48:? #6:? #6;R;
VW 970 GOSUB 70
VQ 980 ? #6;ANS-48:R=R*10+(ANS-48)
OU 990 POKE TXTROW,3:POKE TXTCOL,28:? R;"
    ";
BT 1000 DELAY=100-R
AC 1010 RETURN
FM 1020 POSITION 0,12:? #6;"Start=UP
    ":REM GO UP FAST
UC 1030 IF PEEK(CONSOL)<>6 THEN 1030
KO 1040 POKE PORTA,D:POKE CONSOL,7
ZE 1050 POKE PORTA,C
YQ 1060 POKE PORTA,B
YC 1070 POKE PORTA,A
OV 1080 P=P+1
IN 1090 POKE TXTROW,2:POKE TXTCOL,28:? P;
   " ";
XQ 1100 IF PEEK(CONSOL)=6 THEN 1040
AE 1110 RETURN
SV 1120 POSITION 0,12:? #6;"Start=down
     ":REM GO DOWN FAST
VJ 1130 IF PEEK(CONSOL)<>6 THEN 1130
IR 1140 POKE PORTA,A:POKE CONSOL,7
YP 1150 POKE PORTA,B
ZJ 1160 POKE PORTA,C
AD 1170 POKE PORTA,D
PP 1180 P=P-1
IP 1190 POKE TXTROW,2:POKE TXTCOL,28:? P;
   " ";
YW 1200 IF PEEK(CONSOL)=6 THEN 1140
AG 1210 RETURN
TG 1220 REM DISPLAY SETTINGS
JA 1230 POSITION 12,0:? TP;:POSITION 12,1
   :? L;:POSITION 12,2:? P;
YS 1240 POSITION 12,3:? R;:RETURN
GB 1250 POKE PORTA,255:REM TURN OFF ALL T
   HE PHASES
YQ 1260 ? "PRESS START TO KEEP RUNNING,"
CA 1270 IF PEEK(CONSOL)<>6 THEN 1270
RW 1280 GOTO 370
AR 1290 POSITION 0,12:? #6;"Working...
      ":REM MOVE TO TOP
BI 1300 IF P=TP THEN 1380
KL 1310 POKE PORTA,D:POKE CONSOL,7
ZB 1320 POKE PORTA,C
YN 1330 POKE PORTA,B
XZ 1340 POKE PORTA,A
GZ 1350 P=P+1+((P>TP)*-2)
IK 1360 POKE TXTROW,2:POKE TXTCOL,28:? P;
   " ";
XM 1370 IF P<>TP THEN 1300
CW 1380 ? #6:? #6;"move done          ":FO
   R PAUSE=1 TO 150:NEXT PAUSE
BG 1390 RETURN
VP 1400 POSITION 0,12:? #6;"Working...
         "
ST 1410 IF P=L THEN 1490
IR 1420 POKE PORTA,A:POKE CONSOL,7
YP 1430 POKE PORTA,B
ZJ 1440 POKE PORTA,C
AD 1450 POKE PORTA,D
IR 1460 P=P-1+((P<L)*2)
IP 1470 POKE TXTROW,2:POKE TXTCOL,28:? P;
   " ";
LX 1480 IF P<>L THEN 1410
OG 1490 ? #6;"move done           ":FOR PAU
   SE=1 TO 150:NEXT PAUSE
AJ 1500 RETURN
CQ 1510 FOR Q=1 TO DELAY
BV 1520 IF PEEK(CONSOL)=6 THEN WLOOP=2
RW 1530 NEXT Q:GOSUB 1730:RETURN
JQ 1540 GRAPHICS 17:REM TITLE SCREEN
VO 1550 FOR X=1 TO 3:? #6;"          ":NEXT
   X
MR 1560 ? #6;"    ◢*◢*◢*◢*◢*◢*◢*"
BO 1570 ? #6;"    * Microscope ◢"
IO 1580 ? #6;"    ◢stage driver*"
EK 1590 ? #6;"    *◢*◢*◢*◢*◢*◢*◢"
BJ 1600 FOR X=1 TO 5:? #6;" ":NEXT X
MC 1610 ? #6;"":? #6;"":? #6;" "
MR 1620 ? #6;"         BY"
IJ 1630 ? #6;"  SCOTT KILBOURNE"
ZY 1640 ? #6;"    WILLIAM HALL"
IS 1650 ? #6;"    JON HOLCOMB"
QF 1660 ? #6;"":? #6;"[illegible] antic"
BI 1670 ? #6;""
IA 1680 ? #6;"←←←←←←←←←←PRESS START";
XP 1690 FOR WLOOP=0 TO 1 STEP 0
JP 1700 GOSUB 1710:NEXT WLOOP:RETURN
QT 1710 POKE 708,0:POKE 709,15:GOSUB 1510
GV 1720 POKE 708,15:POKE 709,0:GOSUB 1510
   :RETURN
AN 1730 POKE 77,0:POKE 764,255:IF BRK THE
   N POKE 16,64:POKE 53774,64
AZ 1740 RETURN
FH 1750 DUR=1:LO=57:HI=45:NT=HI
RT 1760 FOR TIME=0 TO DUR*2
EC 1770 SOUND 0,NT,10,14
PP 1780 FOR WT=1 TO 18
BL 1790 IF PEEK(CONSOL)=6 THEN WLOOP=1
XX 1800 NEXT WT
GA 1810 NT=LO:LO=HI:HI=NT
PL 1820 NEXT TIME
XZ 1830 SOUND 0,0,0,0:RETURN
```

ST RESOURCE

STEPPER MOTOR ROBOT-CONTROLLER

Article on page 62

LISTING 1

```
/*
 *  ST Stepper Motor
 *  (c) 1986 Antic Publishing
 *  Version 073086  Wednesday
```

continued on next page

```
*  Written by Patrick Bass
*
*  The purpose of this program is to explore creating
*   and manipulating a form while performing a job.
*
*---- Alcyon Include File -----------------*/

#include        "stepper.h"
#include        "osbind.h"

#define    TRUE              (1)
#define    FALSE             (0)
#define    begin             {
#define    end               }
#define    wend              }
#define    repeat            }
#define    next              }
#define    endif             }
#define    not               !
#define    equals            ==
#define    does_not_equal    !=
#define    then
#define    CONSOL            2
#define    PRINTER           0
#define    DELAY             for( i=0; i<1000; i++ );
#define    LWGET(x)          ( (int) *((int *)(x)) )
#define    OB_W(x)           ( box_address+(x)*sizeof(OBJECT)+20 )
#define    OB_H(x)           ( box_address+(x)*sizeof(OBJECT)+22 )

typedef  struct  object
     begin
          int               ob_next;
          int               ob_head;
          int               ob_tail;
          unsigned int      ob_type;
          unsigned int      ob_flags;
          unsigned int      ob_state;
          long              ob_spec;
          int               ob_x;
          int               ob_y;
          int               ob_width;
          int               ob_heigth;
     end  OBJECT;

typedef  struct  text_edinfo
     begin
          long              te_ptext;
          long              te_ptmplt;
          long              te_pvalid;
          int               te_font;
          int               te_junk1;
          int               te_just;
          int               te_color;
          int               te_junk2;
          int               te_thickness;
          int               te_txtlen;
          int               te_tmplen;
     end  TEDINFO;

/*---------------- Alcyon Declarations/Equates --------*/
int  contrl[ 12 ],
     intin[ 256 ],  ptsin[ 256 ],
```

```
        intout[ 256 ], ptsout[ 256 ],
        workin[]={ 1,1,1,1,1,1,1,1,1,1,2 }, workout[ 57 ],
        i, j, k, l, x, y, w, h,
        mtopx, mtopy, mbotx, mboty,
        t_x, t_y, t_w, t_h,
        b_x, b_y, b_w, b_h,
        c_x, c_y, c_w, c_h,
        s_x, s_y, s_w, s_h,
        top, bottom, current, speed,
        delay, drive, dum, gem_handle,
        button, pressed, finished, xdial, ydial, wdial, hdial;

char    topstring[ 20 ],  botstring[ 20 ],
        currstring[ 20 ], speedstring[ 20 ],
        a, b, c, d;

long  box_address;

/*--------------------------------------------------------------------*/
main()
begin
        initialize();

        do begin

                move_the_stepper_motor();

        repeat while( not finished );

        terminate();
end

/*-----------------------------------*/
initialize()
begin
        appl_init();
        gem_handle=graf_handle( &i, &i, &i, &i );
        v_opnvwk( workin, &gem_handle, workout );

        rsrc_load( "\STEPPER.RSC" );
        rsrc_gaddr( 0, TREE1, &box_address );

        a=5; b=6; c=10; d=9;

        graf_mouse( 0, 0L );
        finished=FALSE;
end

/*-----------------------------------*/
move_the_stepper_motor()
begin
        x=0; y=0, w=10, h=10;
        form_center( box_address, &xdial, &ydial, &wdial, &hdial );

        find_box_sizes();

        form_dial ( 0, x, y, w, h, xdial, ydial, wdial, hdial );
        form_dial ( 1, x, y, w, h, xdial, ydial, wdial, hdial );

        objc_draw( box_address, TREE1, 2, xdial, ydial, wdial, hdial );

        do begin
```

continued on next page

```
        button=form_do( box_address, 0 );

        if( button equals MOVETOP )then move_top();
        if( button equals MOVEBOT )then move_bottom();

        if( button equals TOPUP )then d_topup();
        if( button equals TOPDN )then d_topdn();

        if( button equals BOTUP )then d_botup();
        if( button equals BOTDN )then d_botdn();

        if( button equals CURRUP )then d_curup();
        if( button equals CURRDN )then d_curdn();

        if( button equals SPEEDUP )then d_speup();
        if( button equals SPEEDDN )then d_spedn();

    repeat while( button does_not_equal QUIT );

    form_dial( 3, x, y, w, h, xdial, ydial, wdial, hdial );
    form_dial( 2, x, y, w, h, xdial, ydial, wdial, hdial );

    finished=TRUE;
end

/*----------------------------------*/
find_box_sizes()
begin
    objc_offset( box_address, TOPNUM, &t_x, &t_y );
    t_w=( LWGET( OB_W( TOPNUM )))-1;
    t_h=( LWGET( OB_H( TOPNUM )))-1;

    objc_offset( box_address, BOTNUM, &b_x, &b_y );
    b_w=( LWGET( OB_W( BOTNUM )))-1;
    b_h=( LWGET( OB_H( BOTNUM )))-1;

    objc_offset( box_address, CURRNUM, &c_x, &c_y );
    c_w=( LWGET( OB_W( CURRNUM )))-1;
    c_h=( LWGET( OB_H( CURRNUM )))-1;

    objc_offset( box_address, SPEEDNUM, &s_x, &s_y );
    s_w=( LWGET( OB_W( SPEEDNUM )))-1;
    s_h=( LWGET( OB_H( SPEEDNUM )))-1;
end

/*----------------------------------*/
d_topup()
begin
    top=top+1;
    adjust( TOPNUM, top, &topstring, t_x, t_y, t_w, t_h );
end

/*----------------------------------*/
d_topdn()
begin
    if( top>bottom )then begin
        top=top-1;
        adjust( TOPNUM, top, &topstring, t_x, t_y, t_w, t_h );
        if( top<=current )then begin
            current=top;
            d_curdn();
        endif
    endif
```

```
end

/*-----------------------------------*/
d_botup()
begin
     if( bottom<top )then begin
          bottom=bottom+1;
          adjust( BOTNUM, bottom, &botstring, b_x, b_y, b_w, b_h );
          if( bottom>=current )then begin
               current=bottom;
               d_curup();
          endif
     endif
end

/*-----------------------------------*/
d_botdn()
begin
     bottom=bottom-1;
     adjust( BOTNUM, bottom, &botstring, b_x, b_y, b_w, b_h );
end

/*-----------------------------------*/
d_curup()
begin
     int  i;

     current=current+1;
     adjust( CURRNUM, current, &currstring, c_x, c_y, c_w, c_h );
     Bconout( PRINTER, d ); DELAY
     Bconout( PRINTER, c ); DELAY
     Bconout( PRINTER, b ); DELAY
     Bconout( PRINTER, a ); DELAY
end

/*-----------------------------------*/
d_curdn()
begin
     int  i;

     current=current-1;
     adjust( CURRNUM, current, &currstring, c_x, c_y, c_w, c_h );
     Bconout( PRINTER, a ); DELAY
     Bconout( PRINTER, b ); DELAY
     Bconout( PRINTER, c ); DELAY
     Bconout( PRINTER, d ); DELAY
end

/*-----------------------------------*/
d_speup()
begin
     speed=speed+1;
     adjust( SPEEDNUM, speed, &speedstring, s_x, s_y, s_w, s_h );
end

/* ----------------------------------*/
d_spedn()
begin
   if( speed>0 )then begin
        speed=speed-1;
        adjust( SPEEDNUM, speed, &speedstring, s_x, s_y, s_w, s_h );
   endif
```

continued on next page

```
end

/*-----------------------------------*/
adjust( object, variable, string, x, y, w, h )
int  object, variable, x, y, w, h;
char *string;
begin
       ftoa( (float)variable, string, 0 );
       set_text( box_address, object, string );
       objc_draw( box_address, object, 1, x, y, w, h );
       beep( 0, 1, 50 );
end

/*-----------------------------------*/
set_text( tree_address, obj_number, string_address )
OBJECT       *tree_address;
int          obj_number;
char         *string_address;

begin
       TEDINFO    *obj_specification;

       obj_specification=(TEDINFO *)(tree_address+obj_number)->ob_spec;
       obj_specification->te_ptext=( string_address );
       obj_specification->te_txtlen=( 4 );
end

/*-----------------------------------*/
move_top()
begin
       int   i, j, k, mx, my, pressed, key;

       for( i=current; i<top; i++ )begin
              graf_mkstate( &mx, &my, &pressed, &key );
              if( pressed )then i=top;
              if( not pressed )then begin
                     d_curup();
                     for( j=0; j<speed; j++ )begin
                            for( k=0; k<500; k++ );
                     next
              endif
       next
       beep( 0, 2, 15000 );
       beep( 0, 1, 15000 );
       beep( 0, 2, 15000 );
end

/*-----------------------------------*/
move_bottom()
begin
       int   i, j, k, mx, my, pressed, key;

       for( i=current; i>bottom; i-- )begin
              graf_mkstate( &mx, &my, &pressed, &key );
              if( pressed )then i=bottom;
              if( not pressed )then begin
                     d_curdn();
                     for( j=0; j<speed; j++ )begin
                            for( k=0; k<500; k++ );
                     next
              endif
       next
```

TYPO ST codes for Deduction!

Don't type these.

1000	:07FC
1010	:0879
1020	:0E26
1030	:00EB
1040	:07E7
1050	:06D8
1060	:0E3A
1070	:00EF
1080	:0603
1090	:08A6
1100	:071E
1110	:08A1
1120	:05D4
1130	:097C
1140	:05D2
1150	:040C
1160	:0AC1
1170	:08B5
1180	:04CA
1190	:06C2
1200	:0B2C
1210	:058B
1220	:0713
1230	:05C8
1240	:05F6
1250	:07EE
1260	:03D2
1270	:051F
1280	:0803
1290	:03D5
1300	:04A4
1310	:0818
1320	:0A5F
1330	:04B4
1340	:045B
1350	:0717
1360	:0679
1370	:0420
1380	:02ED
1390	:067A
1400	:0871
1410	:088B
1420	:06EC
1430	:07C3
1440	:053D
1450	:0479
1460	:0890
1470	:0720
1480	:07C8
1490	:04F8

```
      beep( 0, 2, 15000 );
      beep( 0, 1, 15000 );
      beep( 0, 2, 15000 );
end

/*-----------------------------------*/
beep( notelo, notehi, delay )
char  notehi;
int   notelo, delay;

begin
      int  portstate;

      Giaccess( 15, 8+128 );
      Giaccess( 0, 128 );
      portstate=Giaccess( portstate, 7 );
      Giaccess( 60, 7+128 );

      Giaccess( notelo, 0+128 );
      Giaccess( notehi, 1+128 );

      for( i=0; i<delay; i++ );
      Giaccess( 0, 0+128 );
      Giaccess( 0, 1+128 );

      Giaccess( portstate, 7+128 );
      Giaccess( 0, 8+128 );
end

/*-----------------------------------*/
terminate()
begin
      rsrc_free();
      v_clsvwk( gem_handle );
      appl_exit();
end
```

ST RESOURCE

DEDUCTION!

Article on page 89

LISTING 1

```
1000   'ST Classics:  MASTERMIND
1010   '(c)1986 Antic Publishing
1020   'Written by Paul Pratt & Steven Evermann
1030   '
1040   defint A, Z:gosub KOLOR
1050   A#=GB:MOUSE=peek( A#+12 )
1060   fullw 2:clearw 2:randomize 0:TRUE=1:FALSE=0
1070   '
1080   clearw 2:color 1
1090   gotoxy 22, 0: print "#############"
1100   gotoxy 22, 1: print "#           #"
1110   gotoxy 22, 2: print "#############"
1120   TXT=4:gosub TEXT
```

1500	:03EE
1510	:074F
1520	:03D1
1530	:03B3
1540	:0458
1550	:01D4
1560	:0365
1570	:03D4
1580	:04CF
1590	:0330
1600	:1281
1610	:122A
1620	:0881
1630	:050D
1640	:04E3
1650	:02C7
1660	:099C
1670	:0729
1680	:0358
1690	:0370
1700	:02BF
1710	:03ED
1720	:073A
1730	:04C2
1740	:0727
1750	:072E
1760	:036E
1770	:01F2
1780	:0401
1790	:0644
1800	:0735
1810	:0741
1820	:0649
1830	:048E
1840	:036D
1850	:0667
1860	:0FEA
1870	:08D8
1880	:03D8
1890	:0C9D
1900	:0F80
1910	:0315
1920	:03AC
1930	:0A0B
1940	:03F2
1950	:08FB
1960	:03F5
1970	:0932
1980	:07ED
1990	:079C
2000	:06AC
2010	:08CF
2020	:0283
2030	:0775
2040	:081F
2050	:08D4
2060	:0287
2070	:07BC
2080	:0600

continued on next page

```
1130  gotoxy 24, 1: print "DEDUCTION"
1140  TXT=0:gosub TEXT
1150  color 1, 8, 14
1160  gotoxy 17, 17: print " ACCEPT    REJECT";
1170  gotoxy 25, 4: print "ANSWER"
1180  'answer box
1190  C=1:F=8:BX=206:BY=35:L=38
1200  W=89:gosub BOX:fill 229, 41:fill 269, 40
1210  BY=49:L=18:W=18:F=11
1220  for BX=210 to 281 step 21
1230  gosub BOX:next
1240  'deduction box
1250  F=0:C=14:BX=203:BY=6:L=17:W=94
1260  gosub BOX
1270  'message box
1280  F=0:C=1:BX=206:BY=79:W=89:L=67
1290  gosub BOX
1300  'accept box
1310  F=7:C=1:BX=150:BY=152:W=72:L=12
1320  gosub BOX:fill 164, 158:fill 196, 157
1330  'reject box
1340  F=2:BX=222:W=72
1350  gosub BOX:fill 236, 157
1360  color 1, 11:fill 3, 100
1370  gosub MENU
1380  COLUM=13
1390  'guessing boxes
1400  W=26:F=8:L=8:C=1:COLUM=COLUM-1
1410  for BY=6 to COLUM*12-4 step 12
1420  for BX=30 to 137 step 28
1430  gosub BOX:next:next
1440  'reply boxes
1450  W=8:F=8:L=8:C=9
1460  for BY=6 to COLUM*12-4 step 12
1470  for BX=151 to 193 step 12
1480  gosub BOX:next:next
1490  gosub INITIAL
1500  'pointer
1510  F=1:C=1:BX=10:BY=8:L=4:W=17
1520  gosub BOX
1530  gosub 2350
1540  ROW=1:COLUM=1
1550  FO=7
1560  MAINLOOP:
1570  gosub RAT
1580  F=INT( ( MX-10 )\20 )
1590  IST=9+D*20
1600  if MB=1 and MX>IST and MX<150 and YOK and FO<>F then gosub CHOOSE
1610  if MB=1 and MX>222 and MX<294 and MY>173 and MO<>MX then gosub 1700
1620  if ROW =5 then gosub ACCEPT
1630  if MB=2 then 2230
1640  goto MAINLOOP
1650  CHOOSE:
1660  color 1, CO( F ):FO=F:GUS( ROW )=CO( F )
1670  fill ROW*28+14, COLUM*12-2
1680  ROW=ROW+1
1690  return
1700  REJECT:
1710  gosub 2350:
1720  if ROW>1 then ROW=ROW-1
1730  color 1, 8:FO=7
1740  fill ROW*28+14, COLUM*12-2
1750  for DELAY=1 to 10:next
1760  return
1770  BOX:
1780  color 1, F, C
1790  linef BX, BY, BX, BY+L
1800  linef BX, BY+L, BX+W, BY+L
1810  linef BX+W, BY+L, BX+W, BY
1820  linef BX+W, BY, BX, BY
```

2090	:0604
2100	:0A53
2110	:0A77
2120	:0756
2130	:03CF
2140	:04AA
2150	:0EE8
2160	:030D
2170	:0403
2180	:0404
2190	:03CD
2200	:050C
2210	:075B
2220	:055F
2230	:02D1
2240	:03EC
2250	:04D3
2260	:06A9
2270	:0420
2280	:03F0
2290	:03AB
2300	:06A4
2310	:07E3
2320	:09E7
2330	:03D1
2340	:0347
2350	:00F1
2360	:047A
2370	:0C9A
2380	:0D93
2390	:08D6
2400	:084C
2410	:08E5
2420	:0368
2430	:01EA
2440	:0423
2450	:0589
2460	:058D
2470	:0579
2480	:0CC5
2490	:036F
2500	:0288
2510	:03C5
2520	:0499
2530	:0620
2540	:04E0
2550	:06E6
2560	:06AC
2570	:058D
2580	:0504
2590	:0772
2600	:0368
2610	:01F1
2620	:0E8B
2630	:0BB1
2640	:036C
2650	:0377

```
1830  fill BX+2, BY+2
1840  return
1850  ACCEPT:gosub EMPTY
1860  gotoxy 23, 10: print "  ACCEPT":gotoxy 23, 12: print "    OR     "
1870  gotoxy 23, 14: print "  REJECT"
1880  gosub RAT
1890  if MB=1 and MX>149 and MX<222 and YOK then 1920
1900  if MB=1 and MX>222 and MX<294 and YOK and MO<>MX then 1700
1910  GOto 1880
1920  BLK=0:WHT=0
1930  gosub 2350:'PRINT SELECT 4 colors
1940  for X=1 to 4
1950  if GUS( X )=PAT( X ) then BLK=BLK+1
1960  for Y=1 to 4
1970  if GUS( X )=PAT( Y ) then WHT=WHT+1
1980  next:next:WHT=WHT-BLK
1990  color 1, 0:for X=1 to WHT
2000  fill X*12+146, COLUM*12-2
2010  sound 1, 10, 3, 5, 5:sound 1, 0, 0, 0, 0
2020  next
2030  color 1, 1:for X=1 to BLK
2040  fill ( X+WHT )*12+146, COLUM*12-2
2050  sound 1, 10, 3, 6, 5:sound 1, 0, 0, 0, 0
2060  next
2070  F=11:C=11:BX=10:BY=COLUM*12-4
2080  L=4:W=17:gosub BOX
2090  ROW=1:COLUM=COLUM+1
2100  if BLK=4 then gosub WIN:goto 2230
2110  if COLUM>12 then MB=2:FO=0:return
2120  F=1:C=1:BX=10:BY=COLUM*12-4
2130  gosub BOX
2140  FO=7:return
2150  if FL=0 then TRYS=TRYS-1:gotoxy 13, 7: print TRYS
2160  INITIAL:
2170  RandOMIZE 0
2180  for X=D to 6
2190  TEMP=PAT( X )
2200  Y=INT( RND*( 7-D ) )+D
2210  PAT( X )=PAT( Y ):PAT( Y )=TEMP
2220  next:return
2230  ANSWER:
2240  for X= 1 to 4
2250  color 1, PAT( X )
2260  fill X*18+205, 51:next
2270  gosub MENU
2280  for X= 1 to 4
2290  color 1, 11
2300  fill X*18+205, 51:next
2310  if COLUM>12 then goto 1400
2320  F=11:C=11:BX=10:BY=COLUM*12-4:W=17:L=4
2330  gosub BOX
2340  goto 1400
2350  '
2360  gosub EMPTY
2370  color 11: gotoxy 23, 9: print  "RIGHT=ANSW"
2380  color 1: gotoxy 23, 10: print string$( 11, 249 )
2390  gotoxy 23, 11: print "  SELECT"
2400  gotoxy 23, 13: print "   FOUR "
2410  gotoxy 23, 15: print "  COLORS"
2420  return
2430  RAT:
2440  gemsys( 79 )
2450  MX=peek( MOUSE+2 )
2460  MY=peek( MOUSE+4 )
2470  MB=peek( MOUSE+6 )
2480  YOK=FALSE: if MY>174 and MY<186 then YOK=TRUE
2490  return
2500  KOLOR:
2510  dim KOL%( 16 )
```

2660	:09C4
2670	:0C31
2680	:05DC
2690	:0CD7
2700	:0A7A
2710	:089F
2720	:073C
2730	:0926
2740	:049B
2750	:0580
2760	:07DE
2770	:05DC
2780	:04DA
2790	:05D4
2800	:0596
2810	:036B
2820	:023B
2830	:047C
2840	:0894
2850	:05DC
2860	:09DE
2870	:05DD
2880	:0B0E
2890	:09B5
2900	:09EF
2910	:09FF
2920	:03D4
2930	:0FC0
2940	:04FC
2950	:0584
2960	:0518
2970	:0562
2980	:0373
2990	:029D
3000	:036F
3010	:03C2
3020	:0703
3030	:0285
3040	:0367
3050	:0247
3060	:0981
3070	:09A0
3080	:032E
3090	:036C

continued on next page

```
2520  restore 2550
2530  for A=0 to 15:read B
2540  KOL%( A )=B:next
2550  data 1911, 1792, 112, 51, 775, 80
2560  data 5, 1365, 546, 101, 51, 1904
2570  data 1796, 1360, 1285, 0
2580  defdbl K: K = 1114
2590  poke K, varptr( KOL%( 0 ) )
2600  return
2610  WIN:
2620  for Y=1 to 3: for X=7 to 10: sound Y, 13, X, 5+Y, 2: next
2630  next: for Y=1 to 3: sound Y, 0, 0, 0: next
2640  return
2650  KOLORBOX:
2660  gosub EMPTY: TXT=1:gosub TEXT
2670  color 5: gotoxy 23, 9: print " RESETTING "
2680  TXT=0:gosub TEXT
2690  color 1:gotoxy 23, 10: print  STRING$( 11, 249 )
2700  gotoxy 25, 11: print  chr$( 189 );" 1986"
2710  gotoxy 23, 13: print "   PRATT   "
2720  gotoxy 23, 14: print "     &     "
2730  gotoxy 23, 15: print "  EVERMAN "
2740  restore 2800
2750  BY=152: C=1: W=12: L=12
2760  for BX=10+D*20 to 130 step 20
2770  read F: X=( ( BX-10 )/20 )
2780  CO( X )=F: PAT( X )=F
2790  gosub BOX: next
2800  data 2, 14, 7, 10, 4, 13, 12
2810  return
2820  MENU:
2830  gosub EMPTY
2840  gosub RAT: if MB<>0 then 2840
2850  TXT=1:gosub TEXT
2860  gotoxy 23, 9: print "CLICK MOUSE"
2870  TXT=0:gosub TEXT
2880  gotoxy 23, 10: print  string$( 11, 249 )
2890  gotoxy 23, 11: print "LEFT = EASY"
2900  gotoxy 23, 13: print "RIGHT= HARD"
2910  gotoxy 23, 15: print "BOTH to END"
2920  gosub RAT
2930  if MB=1 then D=1:BX=10:BY=152:C=6:F=11:W=12:L=12:gosub BOX
2940  if MB=2 then D=0
2950  if MB=3 then end
2960  if MB=0 then 2920
2970  gosub KOLORBOX
2980  return
2990  EMPTY:
3000  color 1, 0
3010  FOR X=9 to 15
3020  gotoxy 23, X: print "           "
3030  next
3040  return
3050  TEXT:
3060  poke CONTRL, 106:poke CONTRL+2, 0
3070  poke CONTRL+6, 1:poke INTIN, TXT
3080  VDISYS( 0 )
3090  return
```

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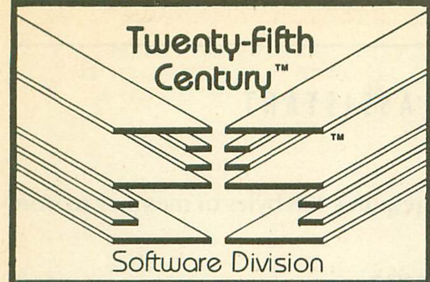
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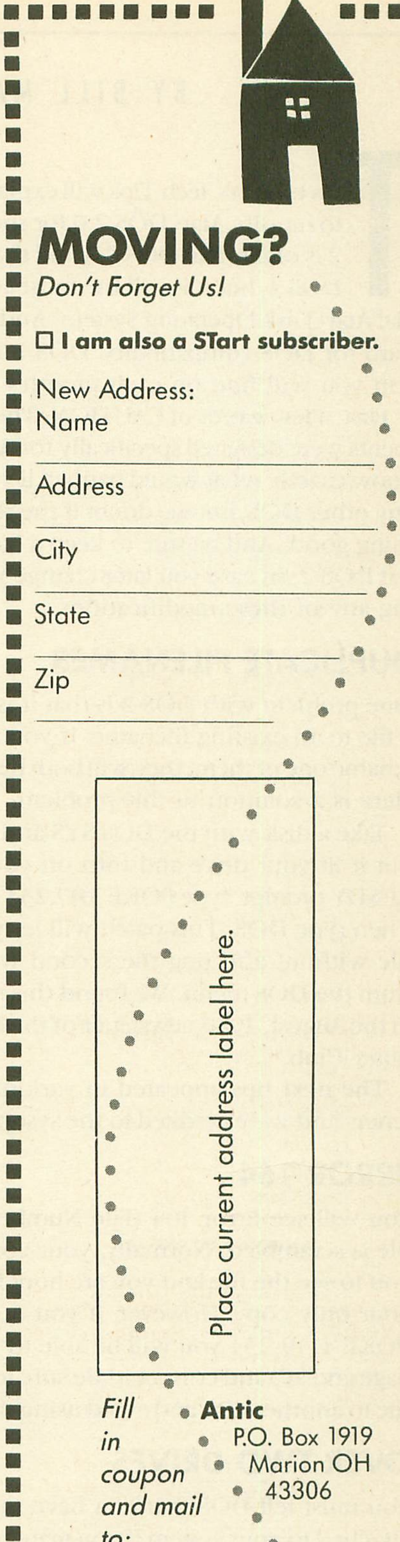
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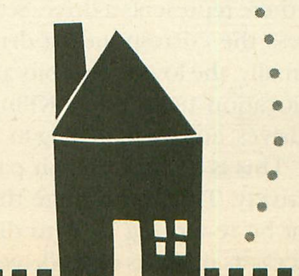
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BY BILL MARQUARDT, ANTIC TECHNICAL ASSISTANT

This month's Tech Tips will explain some handy ways to modify Atari DOS 2.0 for special purposes. DOS 2 is older than DOS 2.5 and the not-recommended DOS 3, but it is still the most commonly used official Atari Disk Operating System. And it serves as the standard for DOS compatibility. DOS 2 is the operating system you will find on each month's Antic Disk.

First, a few words of CAUTION: The following enhancements were designed specifically for Atari DOS 2. We don't know exactly what would happen if you try these changes any other DOS, but we doubt if the results would be anything good. And be sure to keep a backup copy of original DOS 2, in case you later change your mind about using any of these modifications.

DUPLICATE FILENAMES

One problem with DOS 2 is that it is possible to rename a file to an existing filename. If you attempt to delete or rename one of them, they will both be deleted or renamed. Here is a solution to this problem.

Take a disk with the DOS.SYS and DUP.SYS files on it. Put it in your drive and turn on your computer. At the READY prompt, type POKE 3117,234 and POKE 3118,234. Then type DOS. This patch will let you rename the first file without affecting the second when using option E from the DOS menu. We found this tip from Jerry White in the August, 1986 newsletter of the Lawrence Atari Computer Club.

The next tips appeared in various users group newsletters and were credited to the sysop of the Atlantis BBS.

ERROR 164

You will see Error 164 (File Number Mismatch) if your file is scrambled. Normally, your computer won't allow you to see the file and you are hopelessly lost if this was your only copy. However, if you do a POKE 4148,234: POKE 4149,234 you will be able to LOAD your file, garbage and all, and correct it! Be sure to SAVE the corrected file to another disk and avoid using the damaged version.

OVER TWO DRIVES

You must tell DOS that you have more than two drives attached to your system if you want to access them. Location 1802 is the flag for this purpose. Each bit in the byte stored there represents a drive. Setting a bit will allow DOS to access the corresponding drive.

Normally, the lowest two bits are set, so you would find a 3 in location 1802. By POKEing in a 7 you set DOS for three drives, and by POKEing in 15, you set DOS for four drives. This is because the bit patterns are 0111 and 1111 respectively. This is a change that should be made permanent by re-writing DOS to disk after the POKE. You can access as many as eight drives. But keep in mind that every drive you add requires 128 bytes of memory to store its buffer.

OPEN FILE LIMITS

DOS limits you to three simultaneously open files. But if you find this restrictive, you can expand the limit to seven by simply doing a POKE 1801,7. A buffer of 128 bytes is used for each file. Use a number less than seven if you don't want to give up all that valuable RAM.

LOWERCASE FILENAMES

If you are bored with all uppercase filenames try this: POKE 3818,48:POKE 3822,123. Now you can use any ATASCII character from CHR(48) to CHR(122) ("0" to "z"). Note that the second POKE value is the ATASCII value plus one. It is *not* recommended to go above or below these values.

CHANGING WILDCARDS

This tip is of dubious value, but if you would like your wildcard character to be something other than the asterisk [*], POKE 3783 with the ATASCII value of your chosen character.

PERMANENT POKES

Remember that all the above POKEs are made from BASIC in the immediate mode. You do *not* need line numbers. The changes can then be made permanent by typing DOS to go to the DOS menu and using option H to rewrite your modified version of DOS to disk.

DIRECTORY TEXT

Would you like to create a text file on your disk that contains the directory? This short routine by Sally Nagy appeared in the newsletter of the Capitol Hill Atari Owners Society (CHAOS):

```
10 DIM A$(20),B$(1280)
20 OPEN #1,6,0,"D:*.*":TRAP 80
40 INPUT #1;A$:B$(LEN(B$)+1)=A$
60 GOTO 40
80 CLOSE #1:OPEN #1,8,0,"D:DISKDIR"
90 B$(LEN(B$)+1)=" ":B$(LEN(B$)+1)=A$
110 M=17:FOR N=1 TO LEN(B$)/M
130 PRINT #1,B$((N-1)*M+1,N*M)
140 NEXT N:CLOSE #1
```

If you have a Tech Tip that you would like to share with other readers, send it along to Antic Tech Tips, 524 Second Street, San Francisco, CA 94107. You might get your name in print. We always welcome very short programs that demonstrate the Atari's powers, simple hardware modifications, or useful macros for popular software.

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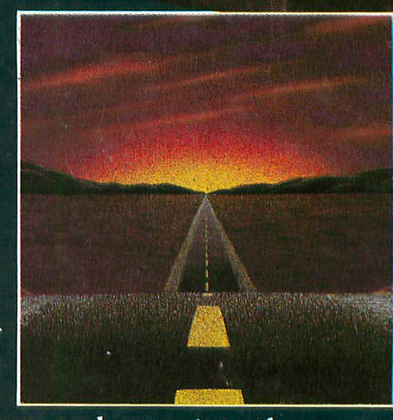
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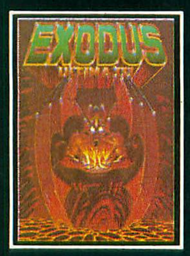
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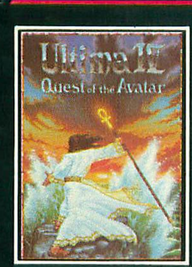
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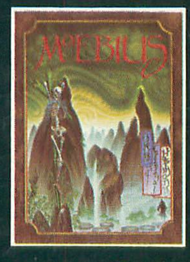
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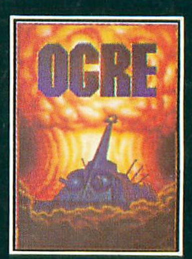
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